MAY

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D. M. Campbell, Editor A. T. Kinsley, Associate Editor

Small quantities of boric acid appear in the urine within five minutes after a saturated aqueous solution of the drug is applied to the unbroken skin.

Vitamine A, the accessory food substance necessary to normal growth, has been found to be closely related chemically to synthetic violet perfume.

Pullorum-infected hens produce fewer eggs than hens that are not infected; but eggs from infected hens are apparently as fertile as eggs from non-infected hens, according to one experiment.

The X-ray may be used to detect lead poisoning in children. Lead absorbed into the body is stored in the bones and may be detected as a dense band at the growing margin.

Vitamine C, the scurvy-preventing accessory food substance, has been shown to be a derivative of narcotine, an alkaloid of opium. Narcotine is transformed into Vitamine C during the ripening of fruits and vegetables.

Vigor and state of nutrition of the horse on the one hand, and degree of worm infestation on the other, are usually mutually related. An appreciable percentage of colic cases are, in all probability, directly traceable to parasites.

The bipolar organism that produces chicken cholera multiplies rapidly in the blood and other tissues of affected fowls preceding and following death. These organisms remain viable in the tissues of the carcass for 10 to 12 days at room temperature and for at least two months in the ice box. Hence the necessity of burning birds dead of cholera.—*Inf. Dis.*

The life cycle and the method of transmission of a common tapeworm, *Moneizia expansa,* of sheep has been a perplexing problem. According to Seddon of Australia, the feeding of fresh ova is not followed by infestation and transmission is therefore not direct from sheep to sheep. Yards and pastures that have been contaminated with ova are later a source of infestation. Hay and other feed crops grown on infested soil may be a source of infestation. Soil may remain infested for a year. There is apparent immunity in lambs that have recovered from an infestation even when they are grazed on infested soil. An immunity may also be produced by drenching lambs with an emulsion prepared from freshly secured ripe proglottides, and according to tests may persist for several months. The life of this parasite in the sheep varies from 65 to 75 days. They become mature in 40 to 50 days and lay eggs from 20 to 30 days.—*Trop. Med. & Par.*

The average number of patients in the leper hospital at Carville, Louisiana (U. S. Marine Hospital) last year was 322. The patient turnover exceeds 100% yearly.

Approximately 40,000 tons of rice bran, 15,000 tons of rice polish and at least 10,000 tons of brewers rice are produced annually in the United States and are available for livestock feeding. These products are relatively rich in protein and fat, and when properly supplemented they are valuable feed for all farm animals.

Sage hens, according to Public Health Reports of February, 1932, may be a source of tularemia. In a recent investigation of a local epizootic in sage hens in Fergus County, Montana, the *B. tularense* was recovered from the tissues of dead and killed sage hens and from ticks (*H. cinnabarina*) that infested the sage hens. Thus another tick has been incriminated as a natural carrier of *B. tularense*.

Doctors Isaacs, Sturgis and associates at the Simpson Institute have succeeded in producing a liver extract that is said to be thirty times more powerful than any previously developed. This extract is suitable for intravenous administration. Only four to six injections are necessary to restore the blood of an anemia sufferer to normal. No other treatment is necessary. In some cases, liver extract injections may be necessary every four to six weeks.—*Science,* 75-1934.

A knowledge of carriers is of importance in the control of infective diseases. The possibility of the spread of the virus of infectious laryngo-tracheitis by mechanical and direct carriers has been investigated by C. S. Gibbs of Amherst. In this investigation it was found that sparrows, mice and pigeons are apparently not susceptible to this virus and as mechanical carriers they are of little or no importance. Humans that handle diseased birds may serve as mechanical carriers of the virus. Chickens affected with the chronic form of the malady are frequently carriers of the virus for varying periods of time.

Bird migration, according to Groebbels, is inspired by internal secretions, especially from the sex and thyroid glands.—*Bio. Abs.* 5907-1932.

Mitchell Brothers of Workworth, Ontario, report the death of a registered Hereford cow from grief because of the sale of her stall mate. According to the report, this cow began to lose weight after the sale of her mate and died in about four months. As soon as she was noted to be ailing, a veterinarian was called and later other veterinarians were called in consultation, but the cause of the condition could not be ascertained. A careful autopsy immediately after death resulted in negative findings. Did this cow die of grief?—*Hereford Journal.*

The following plants are capable of producing hydrocyanic acid in quantities sufficient to cause poisoning in live stock: Chokecherry, blackcherry, Christmas berry, flax, sorghum, arrow grass, velvet grass, Johnson grass, sudan grass. Hydrocyanic acid develops only when growth has been retarded or stopped by drought, frost, wilting, mowing, etc. Eating wilted leaves on cut-down trees is the most common source of hydrocyanic poisoning from chokecherry or wildcherry. Climatic conditions, drought and frosts, and the character of the soil are important factors in the occurrence of hydrocyanic poisoning, particularly in sorghum and the various grasses.—U. S. Dept. of Agric. Leaflet 88.

L. P. Scott, Waterloo, Iowa, has likened retained placental structures to a scab on an external surface injury. The usual method of procedure of removing such a lesion is either to soak in warm water or apply some oleogenous mixture. This same method of procedure is, he believes, equally applicable to retained placental structures. In such cases, it is advisable to use warm water, pumping it in and being certain that it is all drained out; and if this method of procedure does not produce the desired results, apply some mineral oil, which should be left until it has thoroughly permeated and softened the attached placental membranes, which by that time can usually be removed easily.

Ascites has been observed in baby chicks in Missouri. The occurrence of this condition in baby chicks has been reported previously in Iowa. The affected chicks are relatively heavy, because of the accumulated fluid in the body cavity, dull and usually die in a day or two. The cause has not been determined.

There have been many mystery epidemics. In 1925 "mud fever" appeared in flooded parts of Germany and later vanished. Nothing like it had ever been seen before. Four years ago there appeared in Frankfort, Germany, and Paris, France, a disorder called the "fifth disease" because it resembled four other children's diseases. No one knows what it was; it had never been heard of before and has never been seen since. Five years ago the Dutch steamship Insulinde, on a voyage from Java to Holland, was stricken in midocean with a mysterious disease. The ship's physician was baffled. No one died, and after some days all began to recover. The disease was never identified.—Dr. Robert Kingman in an article on "Diseases from the Sky."

To maintain a band of sheep on a small farm requires constant vigilance because of the ravages of parasites, particularly of stomach worms. According to an article in a recent issue of the *Journal of Agricultural Research*, the weekly administration for one year of copper sulphate in solution, carbon tetrachloride, or tetrachlorethylene did not eliminate all stomach worms but it did reduce the number of parasites to a minimum. Each of the drugs were given to separate groups of sheep. Two sheep treated weekly with carbon tetrachloride died, apparently from the effects of the drug; one in 33 weeks and the other in 34 weeks. Where such a long continued treatment is anticipated, copper sulphate solution or tetrachlorethylene should be used. Medication weekly with these two drugs, using 100cc of a 1% solution of copper sulphate and 5cc of tetrachlorethylene had no observable injurious effect.

Azoturia is a myoglobinemia and a myoglobinuria and not a hemaglobinuria according to Carlström. In other words, the primary source of the hemoglobin in the urine of azoturia cases has its origin from muscle tissue, not from the blood.—Bio. Abs. 1318, 1932.

In an outbreak of pink eye in sheep in Texas observed by Schmidt, the malady was found to be infectious and transmissible by contact and by inoculation. The period of incubation varied from three to 17 days. In one attempt it was not transmissible to goats.

The intermediate host of pigeon malaria is the pigeon fly (Pseudolynchia). This fly seldom leaves its host and does not feed upon other domesticated or wild birds. By cleansing nests and spraying them with waste crankcase oil and dipping pigeons in pyrethin-soap dip, complete eradication of the fly results.—*Bio. Abs.* 4333-1932.

Avian tuberculosis is relatively prevalent in Germany, according to Klimmer. He reported that from 7% to 15% of chickens, 33% of parrots and a small percentage of turkeys, pigeons, ducks, geese and canaries are affected. About one-fourth of swine tuberculosis in Germany is caused by the avian bacilli. Three to 7% of market eggs contained tubercle bacilli and 11% of the eggs from tuberculous fowl were infected. —Bio. Abs. 28218, 1931.

When a man pilots a truck into town and back on a 30 mile trip to collect 3,000 pounds of garbage to feed to his hogs and perfume the atmosphere, he is going broke on the installment plan. If hog cholera losses do not do it quickly, costs of labor and truck hire accomplish it eventually. Garbage feeding, to be profitable, requires more than faith in its feeding value, hope of high prices, and the charity of the neighbors. It's a specialized business that needs a favorable location, considerable experience and a fair break of luck.—Mark Welsh.

Problems of the Hour in Swine Practice

By A. T. KINSLEY, Kansas City, Missouri

THE following questions and answers are from a round-table discussion of swine diseases at a recent state veterinary meeting:

Does 60cc serum and 2cc virus render less immunity to a 50-pound normal pig than 28cc serum and 2cc virus? Is it possible to give too much serum, thus offsetting the reaction to the virus?

(a) An immunity of the same degree and duration will be produced in a 50-pound pig by the injection of 60cc of serum and 2cc of virus as is produced by 28cc of serum and 2cc of virus, provided the virus is the same virulence in both cases and, provided further the 60cc of serum and 28cc of serum was of the same potency and provided still further that the 28cc of serum is ample dosage.

(b) No.

Does a dose of serum larger than minimum dosage required decrease length of immunity?

No. It is generally conceded that an active, acquired immunity to hog cholera is of life duration, provided the animal in question has been immunized after the baby stage. An increased dosage of serum does not interfere with the production of an active immunity and, therefore, an excess dosage of serum does not decrease the duration of the immunity.

What is the average minimum dose, of the average commercial virus, necessary to produce immunity?

The quantity of virus is of less importance than its virulency in producing an active acquired immunity. A small dose (½ to 1cc) of virulent virus, will produce as solid and as lasting immunity as will 10 or 20cc of virulent virus. Regardless of whether 1cc, 4cc, 10cc or 20cc of virulent virus is used, the same dosage of serum will suffice. If the virus is of low virulency, regardless of the dosage used, the immunity will not be solid or permanent.

Commercial virus, when properly handled in the field, and if used before expiration date, is virulent and usually from 2 to 4cc dosage is advised and is amply sufficient. It is true that a less quantity could be used with satisfactory results, provided it was all absorbed.

Is it possible to give too large a dose of serum with the usual dose of virus, which would tend to prevent the hog from developing a solid immunity?

The production of an active immunity to hog cholera by the use of virus and antiserum depends upon the administration of sufficient virus to stimulate body cells and tissues to produce products that will destroy or neutralize that type of virus should it ever be re-introduced. The purpose of the serum is to protect against excess virus action and fatality until the body cells and tissue are capable of destroying or neutralizing the virus.

The administration of an excess quantity of serum does not prevent the production of a solid immunity.

Do you consider it an unwise practice to overdose pigs with serum in the routine vaccination?

The standardization of virus and serum on the basis of definite units of virulence and potency has not been accomplished. Until such time that the resistance or susceptibility of the pig can be determined and the standardization of virus and serum can be accomplished it will be advisable to give an ample dosage of serum. Because of the lack of standardization of virus or diminished potency of serum it is advisable to use an over-dose of serum.

The only objection to an overdose of serum is the added expense and at the present price of serum the additional expense is nominal. Use plenty of serum.

What is the trouble when hogs eat straw? What causes pigs to eat their bedding?

The eating of any substance other than feed is evidence of:

1. Hunger due to an insufficiency of feed.

2. Depraved appetite or pica. Depravity of appetite may be caused by a deficiency of some essential ingredient or ingredients in the feed, by indigestion, and parasitism.

3. Habit or vice. In some instances small pigs will form a habit of picking up straw or bedding.

What are the symptoms of swine brucellosis in a barrow?

Porcine brucellosis occurs most frequently in sows. There is involvement of the genital organs. This malady may occur in boars and is primarily evidenced by involvement of the testicles or epididymes. Recently it has been reported that arthritis associated with the brucella abortus is of common occurrence in sows, boars and barrows. These findings are in the form of a preliminary report and have not been verified.

Barrow brucellosis would probably be evidenced only by arthritis.

What makes old sows dry up in milk production following farrowing?

Do they ever come back in milk production?

a. The specific cause of agalactia in sows has not been determined. It is probably the result of some disturbance in ovarian or uterine function that unbalances the internal secretions, that stimulate mammary activity. Agalactia usually occurs within a week or ten days after farrowing.

b. Some cases of agalactia respond favorably, and rather promptly, following the feeding of a barley mash that has slightly fermented. Other cases respond when given maltine. More recently the use of ovarian, placenta and uterine tissue and tissue products has been advocated. We have not observed the results of this treatment.

An occasional sow recovers without treatment.

May anti-erysipelas serum be given in connection with anti-hog cholera treatment?

Erysipelas serum is derived from horses. When injected into swine, it produces a passive immunity of short duration against swine erysipelas. The reaction produced by the injection of erysipelas serum is similar if not identical to the reaction produced by any other foreign proteid. Anti-hog cholera serum as usually prepared is homogenous and homologous. Erysipelas serum and anti-hog cholera serum are compatible and there should be no unusual reaction in a hog that has been injected simultaneously with both these products; excepting the possibility of allergic reactions in an occasional hog that is hypersusceptible, or has an idiosyncrosy to foreign proteids.

Please diagnose the following condition in fall pigs: weight 40 to 60 pounds, good flesh, penned up for two weeks to wean, fed milk, hulled oats and corn. Hips are swollen, temperature around 103.4°F; ten out of a herd of 50 have died.

When stirred up as they come out to eat, they will show nervous symptoms, incoordination and fall prostate. Will come out of it in a few minutes. On autopsy some inflammation of the bladder was observed. All other organs appear normal.

Excepting the swollen hips and cystitis the history and symptoms outlined indicate a dietary disorder. Nervousness, incoordination and unconsciousness characterize calcium and phosphorus deficiency. The apparent swelling of hips may have been due to muscular contraction. Cystitis may have been secondary.

This condition may have been due to some contamination of the feed with substances capable of producing nervousness and the other symptoms noted and cystitis. The writer is inclined to believe that these pigs were primarily affected with a calcium and phosphorus deficiency.

Differentiate the appearance of the lymph glands in swine tuberculosis, hemorrhagic septicemia and anthrax.

a. The lymph-gland lesions of porcine tuberculosis are either cellular, necrotic, caseated and calcified or cellular, necrotic, caseated, fibrous and calcified. The length of time required for the lesion to pass

through the various stages probably depends upon the virulence of the inflecting organism and upon the resistance of the infected animal. Why some tubercular lymph glands become fibrous has not been determined. Involved lymph glands, regardless of the stage of progress of the lesion, are tumefied and enlarged. In some tubercular lymph glands the proliferated fibrous tissue occurs in bands that radiate from the center of the gland to its margin and thus appear similar to the trunk and branches of a tree, hence the name "arbor vitae" lymph gland. Porcine tubercular lymph glands are usually grayish white in color. These lesions are practically non-vascular and are therefore devoid of congestion and hemorrhage.

b. Lymph glands of swine dead of hemorrhagic septicemia are tumefied, usually edematous, congested and hemorrhagic. The intensity of the lesions vary according to the duration of the disease. In acute cases the tumefaction is not extensive and the congestion and hemorrhage are usually not well marked. There may be small punctiform hemorrhages in the cortical portion of the gland with or without a diffuse subcapsular hemorrhage. In other cases there may be diffuse hemorrhage throughout the structure of the gland. The color of the lymph gland will vary from a pale red to dark red, depending upon the extent of hemorrhage.

c. Lymph-gland lesions of porcine anthrax are variable according to the progress of the disease and whether it is acute or chronic. In the beginning in acute cases the lymph glands are tumefied, congested and light red in color. As the disease progresses the gland becomes greatly enlarged, extensively hemorrhagic and dark red in color. It soon becomes necrotic and is brown or gray in color. On incision the gland is moist in the beginning but later becomes dry. As the disease progresses, the necrotic foci become encapsulated and if the necrosis is extensive the entire gland becomes encapsulated.

In chronic cases of anthrax the lymph glands are enlarged and evidence small hemorrhagic foci which later become necrotic and encapsulated.

d. The outstanding lymph-gland lesions of (1) porcine tuberculosis are: necrosis, caseation and calcification, and in some cases fibrous proliferation (arbor vitae glands). (2) Porcine hemorrhagic septicemia are: congestion and hemorrhage. Necrosis is limited if it occurs. (3) Anthrax, marked tumefaction, hemorrhages, necrosis and encapsulation of the necrotic foci.

What is the causative factor in serum shock encountered in immunizing swine?

Serum shock or a condition very similar, if not identical, has occurred for many years, although it was not prevalent to any great extent until 1930 and 1931. There are three factors, each and all of which should be given consideration:

1. The veterinarian who injects the serum.
2. The pig, its condition and particularly the feed that has been provided.
3. The serum.

Practically all veterinarians have equipment for the proper handling of serum and are adept at vaccination and can not be charged with causing serum shock.

This condition has occurred in swine that have been injected with whole blood serum and clear serum heated or unheated. It may occur only in a certain group of swine that are vaccinated on a given farm and the condition may occur only in a few herds, no cases occurring in other herds, in a community even though the same serial of serum is used and the swine are all fed about the same. Shock has occurred, apparently, regardless of the kind of feed. However, evidence appears to indicate that shock is more prone to occur in those swine that have not had feed withheld prior to vaccination.

One factor that in the judgment of the writer may be of importance is the variation in the composition of feeds. It is evident that varying quantities of soil constituents will occur in the same kind of feed grown on different soils, and grown on the same soil different years. It is possible to cause a condition similar if not identical to serum shock by exciting pigs that have been fed on a diet deficient in calcium and phosphorus.

The third factor that enters into shock is the serum. Anti-hog cholera serum is obtained from hogs and is homogenous and homologous, and should not produce an anaphylaxis, but bean extract, sodium chloride and phenol are added to the serum obtained from hyperimmunes. The possible etiologic influence of bean extract, sodium chloride and phenol was investigated by Munce and Hoffman and, according to their preliminary report these substances are not factors in serum shock.

In recent years, serum has been heated as a further safe-guard against infections. The relation of heated serum and shock has been investigated by Munce and Hoffman, and others. The preliminary reports on heated serum indicate that serum heated to 61 or 62° C. for thirty minutes frequently produces shock. However, shock does not occur in all pigs that are injected with serum so heated. Thus, the heating of serum has apparently been an important factor in the cause of shock and another important factor is the idiosyncrasy of pigs probably due to some deficiency.

Give symptoms and lesions of swine pox. Iow infectious is it? Have you seen swine pox and swine erysipelas in the same herd?

a. Swine pox is an infectious disease of hogs characterized by skin eruptions.

Swine pox of a mild type has been prevalent in swine in the corn belt and adjacent territory for several years. The malady has been, until recently, of such a mild type that it frequently passed unnoticed; except in a few cases where serum and virus were used during the incubation stage of pox. During the last few months swine pox has become quite virulent in some localities. Swine pox is quite infectious as 50 to 80% of a herd usually become affected within ten days or two weeks.

The mild type of swine pox has been most prevalent heretofore in suckling pigs and shotes weighing 40 to 60 pounds. Recently the more virulent type of pox has occurred in swine weighing up to 250 pounds.

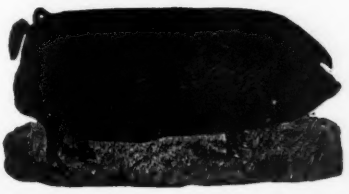
Swine pox is caused by a filterable virus. The inter-relation of variola (pox) in different species of animals is still a mooted question. According to some investigators the virus of swine pox can be transmitted to man, sheep, calves and goats. It is also contended by some that the virus from human, cow and sheep pox can be transmitted to the pig.

The incubation period of swine pox varies from four to seven days.

Symptoms and Lesions.—Swine pox is manifested by fever, dullness, inappetence, weakness and stiff gait. Within two to four days circumscribed cutaneous eruption develops. This eruption occurs primarily on the venter surface of the abdomen, inner side of the thighs and in some cases the major portion of the surface of the body may be involved. The successive changes of the cutaneous eruption of swine pox are usually not as distinct as in most variolas. The vesicles are usually small; umbilicated pustules have not been observed.

There is no treatment for swine pox that is of value. Preventive vaccination has been recommended. The vaccination is done by applying a small quantity of vesicular fluid on the inner side of the thigh after having abraded the skin. Such vaccination may be practical in an affected herd by vaccinating the healthy swine but the vaccination should be done in the early stages for the disease spreads rapidly in a herd.

b. The diagnosis of uncomplicated swine pox is dependent upon the identification of the cutaneous eruption. The simultaneous occurrence of swine pox and erysipelas may result in a symptom complex that may be misleading. Acute swine erysipelas is usually associated with diffuse scarlet red discolorization of the skin of the abdomen, swine pox lesions are circumscribed in the early stages. The temperature is higher and depression and dullness more marked in erysipelas than in pox.



Swine Erysipelas*

By A. J. DeFOSSET, Columbus, Ohio

ALTHOUGH there is considerable data available in veterinary literature on swine erysipelas and its prevalence in the United States during the past decade, there still seems to be considerable speculation in the minds of a few veterinarians as to the actual existence of this disease.

This disease was identified in this country as early as 1920, when the causative organism was isolated by G. T. Creech, of the Pathological Division of the United States Bureau of Animal Industry, from urticarial or "diamond skin" lesions obtained from swine. There is an ever present danger of it becoming a problem of sanitary and economic importance to the swine industry. Swine erysipelas has some importance to veterinarians from its sanitary aspects and we should be interested in its geographical distribution, as well as the symptoms and lesions it causes, that its presence may be readily detected. I will limit my discussion to these important factors.

In presenting this subject I will first quote from a letter under date of December 17, 1931, from H. W. Schoening, acting chief of the Pathological Division of the U. S. Bureau of Animal Industry:

"Swine erysipelas was first definitely recognized as existing in the United States in 1920, when the causative organism was isolated from urticarial lesions or "diamond skin disease" in a number of cases, and reported by Dr. Creech, of this Division.

"Subsequent investigations, and more recent studies by this Bureau, of an outbreak of this disease in South Dakota, in which definite diagnoses were made in seven different cases to date, have proved conclusively that swine erysipelas is prevalent in the United States."

The investigations reported by Creech[1] apparently refer to five cases in particular with urticarial lesions. The origin of the hogs from which specimens were taken was not definitely known with the exception of one which came from Texas. Three of the hogs were slaughtered in Chicago and probably originated in the middle west; the fifth animal was slaughtered near Washington, D. C., and probably originated somewhere in the east. The specimens, therefore, from which *B. erysipelatis suis* were isolated as early as 1920 came from hogs having their origin in widely separated sections of our country. Creech in his concluding remarks says:

"The evidence obtained relative to the organisms isolated from urticarial lesions of swine in the five different cases as described in this paper, particularly with regard to their characteristics culturally and serologically, and also in their pathogenicity for the small experimental animals, would seem quite sufficient to warrant the conclusion that these organisms are a type of *B. erysipelatis suis*, and finally, that the disease of urticaria or 'diamond skin disease' now existing in the United States should in the future be classed as a chronic form of swine erysipelas, just as it has been considered heretofore in European countries."

Ward,[9] in 1922, in discussing The Etiology of Polyarthritis in Swine points to the *B. erysipelelatis suis* as the causative organism. His investigations cover work on a series of twenty-two sets of pig legs exhibiting various stages of arthritis. The first fourteen cases were sent to him by officials of the meat inspection service of the Bureau of Animal Industry and undoubtedly originated from over a wide area in the United States. Ward says that the lesions studied are typical of those observed with great frequency in the principal hog slaughtering establishments of the United States, and as early as 1922 says: "The facts warrant the suspicion that the acute, highly fatal type of swine erysipelas may exist in this country, so far unrecognized." In a large number of the joints he examined there were found the Gram-positive, rod-shaped organisms identified as *Bacterium erysipelatis suis.*

The cases described by Creech and Ward so far are considered as the chronic type of erysipelas.

Giltner[2] in 1922 described a fatal disease in young pigs caused, apparently, by the bacillus of swine erysipelas, which points

* Presented at the Annual Meeting of the Ohio Veterinary Medical Association, Columbus, Jan. 7, 1932.

strongly to the acute type. The organism isolated from the heart blood of a pig which had died was cultured. White mice, also pigeons, were inoculated. The experimental subjects died in from three to five days after inoculation and pure cultures were obtained from the heart blood of the white mice; also from the muscles, blood and liver of the pigeon. According to Giltner the organism recovered agreed in all essential morphologic, staining and cultural characters, as well as pathogenic properties, with the bacillus of swine erysipelas. He regrets, however, that the material was disposed of before determining the presence of cholera virus. It is his belief this would have strengthened his diagnosis of acute swine erysipelas.

Klauder[4] in 1926 states that swine erysipelas occurs in the United States, but probably only in sporadic cases.

In a paper presented by Parker, Lockhart and Ray[7] we have further evidence of a condition in swine which points rather strongly to the sub-acute and acute forms of erysipelas. These investigators, during a three-months' period in the spring of 1922, made systematic observations of certain abnormalties of swine in a large packing house in the middle west, and tabulated during this period one hundred and ten cases for study. The cases selected showed lesions principally of the skin, joints and glands. Some of these cases in addition showed a soft or dark spleen, not much enlarged, hemorrhagic lymph glands, a few petechiae in the kidneys and petechiated lungs and pleura. This group was selected for the reason that the investigators believed the lesions all were from a common cause. Their report is too lengthy to give in detail, but it is of considerable interest to note that of sixteen cases selected from the group of the one hundred and ten, because of lesions pointing strongly to the acute form of the disease, ten revealed the presence of the *B. erysipelatis suis* in the heart blood, the body lymph glands, the kidneys, the spleen, joints and skin. These investigators forwarded cultures from these cases to the Bureau Laboratory at Washington where a confirmatory diagnosis was made.

Kinsley[3] has published a number of articles on swine erysipelas, stressing the fact that it occurs in three forms, acute, subacute and chronic, and describing in detail the symptoms and lesions of each type. During the last three or four years, he has emphasized that the disease and particularly the acute form of the disease, is becoming increasingly prevalent. In 1931 he stated: "Swine erysipelas is one of the important swine diseases, particularly in the north central corn states. This malady has been slowly increasing, more herds showing the affection and more farms becoming infected each year. Until the last few years, the disease was invariably sub-acute or chronic, but recently the acute type of the disease has occurred in several localities."

During the past year reports have come to my attention of cases of the acute form in several of the corn belt states. In order that we may have available information concerning more recent investigations, I addressed letters of inquiry in addition to the one to our Bureau at Washington, to several investigators and authorities of recognition in the mid-western states. The information contained in these communications I feel quite sure will be of interest as well as enlightening on this subject.

I will first quote from a letter by Dr. Frank Breed, Lincoln, Nebraska, under date of November 27, 1931:

"To my knowledge the disease has been identified in the states of Missouri, Iowa, South Dakota and Nebraska. Of course, some other workers may have identified it in animals in other states but it has not been my experience. The first time I encountered this condition was in 1921 or 1922, in material sent me from Iowa. Since that time I have encountered the disease in a number of instances but did not encounter a real acute outbreak until 1928. This outbreak occurred in South Dakota, both in adult animals, sows which were immune to cholera, young susceptible pigs, weaned, and also suckling pigs. Losses were exceptionally high in all classes, it being the septicemic form of the disease, and many of them not being sick more than forty-eight to seventy-two hours.

"The autopsy findings in many of these animals, particularly the younger animals, were in all respects quite suggestive of hog cholera. In all those instances in which we have encountered this condition we have always brought material to the laboratory, isolated the organism, passed it through mice and pigeons and then for our final set-up have sent trans-

fers of the organism to the Bureau of Animal Industry in Washington for the serological test against their known positive serum. And in no instance have I as yet sent cultures into the Bureau which did not check 100% in classification. In the South Dakota outbreak the condition existed on twelve or fourteen farms. In Nebraska an outbreak of the chronic form occurred which affected only the skin with a loss of 17 sows out of 32, leaving those that recovered, with almost the entire back denuded of skin.

"It is difficult many times to determine whether the disease is becoming more prevalent, or whether it is due to more careful observation that we are seeing the disease more often.

"I believe, particularly in South Dakota, the disease in the past year or so has been more prevalent than in previous years, and we are having the condition recognized more frequently in other territories. As I stated before, many times the autopsy findings are so similar to cholera findings that I feel without question the condition has been overlooked when it really was the primary factor in the losses in the herd.

"In discussions of this disease in foreign literature, much stress is placed on the septicemic form, which is prevalent in various parts of Holland, Germany and central Europe. I believe the disease occurs more in this country in a sub-acute form, maybe losing one or two, possibly three animals in the herd, and then the losses automatically stopping."

S. H. Regence, Director, Biological Laboratories, Pitman-Moore Co., Zionsville, Ind., in a communication under date of December 19, 1931, says:

"During the past year, we have received a number of specimens, through the Allied Laboratories' Sioux City Branch, of some suspected cases of swine erysipelas and in the majority of cases we have isolated the organism in pure culture not only from the vital organs but also the heart blood and have subjected the culture to identification procedures which have proved beyond question that these herds were affected with swine erysipelas.

"Of course we have not had an opportunity to observe the disease as it existed in these herds but Doctor Munce, director of the Allied Laboratories, Sioux City, and other members of his force, have observed a large number of field cases of this disease in South Dakota, Iowa and Nebraska, so there can be no doubt as to the existence of swine erysipelas in that territory. We have not encountered this organism in the examination of swine specimens received from Indiana and Ohio, however, this does not mean that the disease does not exist in those states, but we feel that if it does exist in there it does not prevail to any marked extent. The fact that it has become so prevalent in some of the Western states would lead one to believe that it is only a question of time until it will become a common disease throughout the hog-raising section of the country. I think it is very important that we recognize that this disease does exist in order that live stock officials may take steps to prevent its becoming widespread.

"About two years ago we obtained swine erysipelas cultures from Doctor Kinsley, Kansas City, which had been isolated at his laboratory from cases of swine erysipelas existing in different parts of the West. It is my understanding that these cultures were also checked by the Bureau of Animal Industry and found to be pure cultures of *B. erysipelatis*. We also found these cultures to be that organism. All strains of this organism which we have isolated have proved to be highly pathogenic for laboratory animals, pigeons and white mice."

I also have a communication under date of December 14, 1931, from Chas. Murray, Professor, Veterinary Investigation, Iowa State College, Ames, Iowa. With regard to swine erysipelas Doctor Murray says:

"Until a year ago I was under the impression that swine erysipelas was of very rare occurrence in this country. At a meeting of the South Dakota State Veterinary Association in January, 1931, I heard a paper by a Doctor Fosterman of Utica, South Dakota, followed by discussion by various South Dakota practitioners which impressed me that maybe the disease is more extensive than we have been led to believe. No opportunity to see anything suggesting the disease occurred until this fall. Several reports from over the state were received describing an erythema that might be erysipelas. Material from a case from South Dakota reached us and the organism isolated was morphologically that of swine erysipelas. A little later pigs from four herds in Iowa were received all showing the same lesions and yielding the same organism. We then inoculated two pigs, one of 70 pounds weight, with a suspension of the organism subcutaneously; the other one of 25 pounds weight, by scarifying the skin and rubbing in a small quantity of the same culture. Within five days the small pig responded with fever and skin lesions and a little later the larger pig.

"Both animals were slaughtered after 12 days and cultures were obtained from their tissues. . . . I am convinced that the disease does exist in this country and from men who are in closer touch than I with diagnostic work here and elsewhere, I have gathered that it is quite widespread."

You will note from these communications that erysipelas has been definitely diagnosed in Missouri, Nebraska and Iowa and particular reference is made to cases having appeared in South Dakota. J. O. Wilson, Federal Veterinary inspector in charge in South Dakota, in November, 1931, writes as follows:

"We have diagnosed swine erysipelas in several different localities in South Dakota since last spring. Most of these diagnoses have been made in districts where the disease had not heretofore been recognized as swine erysipelas. However, one practitioner in South Dakota has had considerable experience with the disease

since 1927 but same was not positively identified as swine erysipelas until about two years later. The diagnoses above referred to have all been verified by laboratory means, the majority of them by microscopic study as well as animal inoculation tests.

"Through the efforts of the Chief of the Bureau, the Lederle Laboratories have released for experimental use in South Dakota about 4,500cc anti-swine erysipelas serum. Practically all of the 2,500cc comprising the first shipment was used by the practitioner above referred to as having had experience with this disease since 1927.

"It appears that the disease varies in virulency in different localities, morbidity ranging from practically none to as high as 35 to 40% of the herd. On one farm visited in May the owner had lost eight brood sows out of 42 and his pig crop saved up to the time of our visit consisted of less than 40. The owner of this herd had originally come from Holland, apparently a good farmer and stock man, but he stated that following his experience with swine erysipelas during the past three years he felt compelled to discontinue the hog business. Several other farmers in the same community who had raised hogs in Holland stated that the disease, in symptoms and manifestations, was very similar to the same disease encountered by them in Holland. . . .

"The principal symptoms we have noted in our observations to date run about as follows: the animals go off feed, appear listless, and quite early develop a characteristic arching of the back. The temperature will in the early stages run quite high, up to 107° F. or even higher. We have observed but few cases where characteristic skin symptoms commonly described in textbooks were noted. However, we have seen a few where the skin, particularly over the belly, is of a purplish or reddish cast. Labored breathing is apparent in some cases when forced to move, giving the impression that they have some occlusion of the nasal passages. An arthritis also develops, causing lameness or impaired locomotion. In acute outbreaks animals will die in a comparatively short time, sometimes in two or three days, after sickness is noticed. In cases that linger along the affected animals become quite gaunt and in chronic cases a peculiar hard and roughened appearance of the skin is apparent, followed by complete sloughing of portions of the skin, particularly along the back and in the region of the hams. In one case observed the skin of the tail had completely sloughed off. Comparatively few of the chronic cases die, but, according to the observations of the practitioner referred to above, they become carriers of the infection and continue unthrifty.

"In the comparatively few cases that I have seen posted, the anatomical changes have not been well marked. I think the lesions most frequently observed are enlarged, watery lymph glands, spleen sometimes enlarged, a fibrinous exudate in the peritoneal cavity and along the intestinal tract. The amount of fibrin deposited varies from just a few short shreds in some cases to a considerable quantity in others. Cauliflower-like growth on the heart valves, given in the textbooks as a characteristic lesion, has been observed by us to date in but two instances. To my mind the most characteristic lesion we have observed is a peculiar reddened appearance of the stomach wall which the German textbooks describe as having a paint brush appearance. We have observed this in a number of cases and it resembled very much the stroke of a paint brush. The diagnosis has been confirmed in every instance where this lesion was found on post-mortem examination."

It is my personal opinion that there should be no question now as to the presence of this disease in the United States, and it is apparent from data presented here that it has been with us in the chronic form for a considerable period of time. The fact that it has not assumed a position of greater economic importance during all this period is probably the only consoling factor in this malady that is showing its shadow in the field of live stock sanitary control work.

Some cases have been reported in our own state that point strongly to swine erysipelas, but they have not been definitely confirmed by laboratory work. The situation at this time, I believe, is not alarming in any of our states and I would caution you men in going into the field and making a definite diagnosis of swine erysipelas. Especially not until the possibility of other disease conditions have been eliminated. There are now so many complicating and confusing conditions associated with such a common malady as cholera that we must not by any means add to them. Hog cholera, necrotic enteritis and the conditions incident to parasitism still over-shadow all other maladies. On the other hand, we should keep alert and on guard so that we may recognize this disease when present. You may encounter it almost any day as one of those difficult problems in swine diseases which seem almost impossible to solve.

During the past few months there have

been imported into Ohio from the states of North and South Dakota and from South St. Paul, Minn., for feeding purposes, more than 45,000 pigs. With thousands of pigs coming from South Dakota would it be unusual if we were to encounter this disease on some of our Ohio farms? I believe not. As a matter of fact, I have confidence in our field workers who have made the study of swine diseases a specialty, and am convinced that their reports and diagnoses are based on actual observation and scientific study.

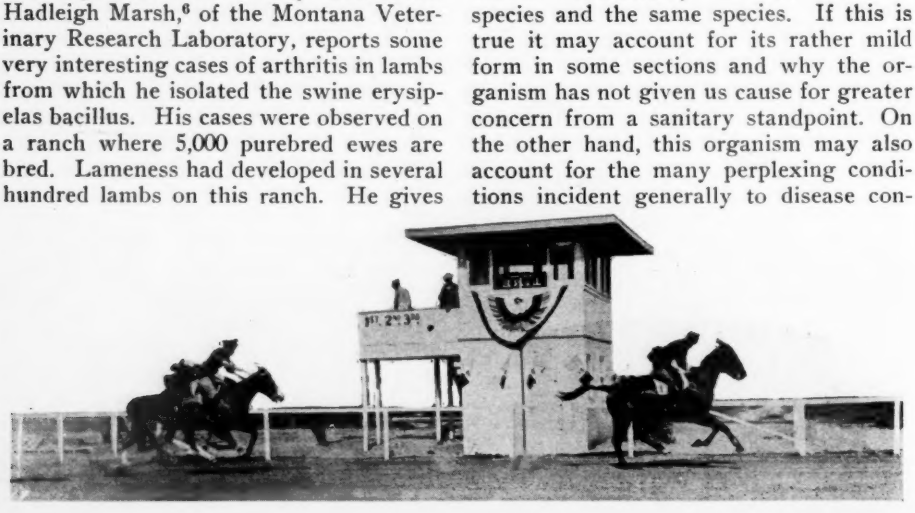
The committee on Swine Diseases of the United States Live Stock Sanitary Association in December, 1931, took cognizance of this disease and embodied in its report the following:

"The increasing number of reports of swine erysipelas in various parts of the United States merits the consideration of those interested in control measures for diseases of livestock. Apparently well authenticated laboratory diagnosis of the disease in South Dakota and Iowa calls attention to the danger of a serious hazard to the swine industry in the cornbelt unless proper measures are taken to suppress it."

Now with reference to identification or diagnosis. We must of course depend upon symptoms and lesions together with laboratory findings. The causative organism is a small Gram-positive, rod-shaped bacterium, pathogenic experimentally for white mice, rabbits and pigeons. The organism seems widely distributed. Hadleigh Marsh,[6] of the Montana Veterinary Research Laboratory, reports some very interesting cases of arthritis in lambs from which he isolated the swine erysipelas bacillus. His cases were observed on a ranch where 5,000 purebred ewes are bred. Lameness had developed in several hundred lambs on this ranch. He gives a splendid report of his findings. You will find it well worth reading.

Tenbroeck[8] gives interesting data on the organisms of swine erysipelas and calls attention to its similarity, morphologically and culturally to the organism also found in mouse septicemia.

Klauder and Harkins[5] give a treatise with regard to this organism in swine and its relation to the human infection which indeed is very interesting. They state: "There are three generally accepted strains of the bacillus of swine erysipelas: human, swine and mouse." And that bacteriologic and serologic studies made by them and others of the organisms obtained from different sources showed them to be identical but modified in virulence and somewhat in morphology, through prolonged passage through their respective hosts. They state further: "The wide dissemination of bacillus of swine erysipelas is extraordinary. Its habitat is dead matter of animal and plant origin. Swine are more frequently infected than any other animal, yet it is curious that a large percentage of healthy swine are carriers of the organism." These investigators are of the opinion that the bacillus of swine erysipelas is either pathogenic or saprophytic throughout the animal kingdom, and that its virulence varies considerably in the different species and the same species. If this is true it may account for its rather mild form in some sections and why the organism has not given us cause for greater concern from a sanitary standpoint. On the other hand, this organism may also account for the many perplexing conditions incident generally to disease con-



trol. The identification of the organism as the cause of arthritis in sheep and swine, urticarial or "diamond skin" disease, and septicemia in the mouse, and its association with an erysipoloid found in man, particularly in employes of slaughtering establishments and fish markets, give rise to ideas that are perplexing enough. But we are concerned here principally with the symptoms and lesions as observed in swine.

The symptoms have been quite fully described in the communication from Doctor Wilson; he has also described the lesions noted in the South Dakota outbreak. Doctor Kinsley[3] in an interesting discussion of swine erysipelas in 1928 says: "The symptoms of the mild form of the disease are indefinite. There may be cutaneous erythema (diamond skin disease), skin sloughs, lameness, enlarged joints, sloughing of ears, tail or feet, depending upon the apparent localization of the infection. The septicemic form of the disease has a sudden onset. The affected animal is indifferent, usually refuses food, retches frequently and may vomit; has a high temperature and may evidence disturbance of the cerebral functions. There is marked weakness and a tendency to incoordination in the hind legs. The conjunctival mucous membrane may be congested and the eyelids swollen. There may be grinding of the teeth and diarrhea is usually present. This form of the disease runs a rapid course and is usually fatal." In a later article he states the herd mortality in per acute outbreaks is practically 100%; that continuous vomiting is almost a pathognomonic symptom and practically the only lesion in the per acute type of the disease is an intense gastritis. The animals die in a few hours after the onset of the vomiting.

With reference to control measures and treatment, it is recommended that the affected individuals be isolated promptly and the usual sanitary measures be adopted. An anti-swine erysipelas serum is being used in the South Dakota cases which apparently promises relief when administered early in the outbreak.

In conclusion I wish to say that there is much evidence that swine erysipelas of the chronic and acute forms is identified in this country and that the organism appears to be quite widely distributed.

Considerable harm could result if the disease were not promptly recognized and as a consequence the herds were treated for other conditions. On the other hand, I would caution against a positive diagnosis of swine erysipelas until there has been entirely eliminated the possibility of other swine diseases as cholera and necrotic enteritis. Material from suspected cases should be sent to a laboratory for a confirmatory diagnosis. The enlarged joints, lymphatic tissue, affected skin, the heart with attached vessels ligated, and suspicious spleen and kidney tissues may be selected. The tissue must be fresh and carefully packed in borax.

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Common Diseases of Young Pigs*

THE wild progenitors of our domestic swine were cleanly animals. Man long has had the misconception that filth is agreeable to swine. Only recently we have found out that, under present conditions, filth and the ailments for which it is directly or indirectly responsible, are the greatest menace of swine and responsible for enormous economic losses to the swine industry. To produce swine profitably, we must begin with healthy pigs, and, therefore, to have healthy pigs, we have to begin even farther back, and provide proper diet and care for the sow.

The diet must include the correct amount of carbohydrates, fats, proteins, minerals, and vitamines, and the care must prevent the breeding of any but healthy sows, and for furnishing them a considerable amount of exercise throughout the gestation period. Information as to the correct proportion of carbohydrates, fats, proteins, minerals, and vitamines is easily available and generally possessed by progressive swine raisers. Adequate vitamines are usually provided by allowing the sow to run on pasture during the summer months, and to procure the major portion of her food there. This, likewise, provides for the necessary exercise. During the winter months, in the northern states, the provision for adequate vitamines and adequate exercise is not so easy, but may be supplied by feeding alfalfa leaf hay or sweet clover leaves or silage, and by keeping the sows in large enclosures and using some ingenuity as to the places of feeding and watering, permitting the animals to follow cattle, etc.

At farrowing time, the feed of the sow becomes far more important to the health of the pigs than it is before farrowing time. For the first three or four days, after farrowing, the sow should receive but very little food. Certainly, no warm slops, tankage or other high protein feeds, that stimulate milk production. It is vital that the pigs do not over-eat during the first two weeks of extra-uterine life. After that period they acquire some tolerance against abuses in the diet, but a whole host of ailments of digestive origin are brought upon the little fellows very early in life by injudicious feeding of the dam.

It can be laid down as an absolute rule that the pigs must not gain a single ounce in weight during the first ten days after they are farrowed, and with the mature, heavy milking sow, this means she must be on practically a starvation diet for that period.

Pig Scours

Pig scours is usually the first ailment to occur in the litters of improperly fed sows. It is commonest in pigs under ten days of age. After that period, they are much less susceptible to this particular digestive derangement. The causes are very definite. Too much feed for the sow, particularly of concentrates, or spoiled feed.

Pig Typhoid

The next ailment to menace the recently farrowed litter is another intestinal ailment, often referred to as infectious pig scours, but a better term, perhaps, is para-typhoid, or pig typhoid. It is due to an infection, but, like the non-infectious pig scours, the diet of the dam is a contributing factor. It is usually seen in pigs from three to six weeks of age. It can be controlled by properly feeding the sow, usually cutting down her allowance, and moving the animals to clean ground. Frost has stated that one ounce of formalin, administered to the sow daily, will control this ailment, but chemists have been unable to find formalin eliminated in the milk, and its value in this condition cannot be said to have been proved.

Beyond question, although infectious, pig typhoid is primarily a filth disease, to be avoided by the proper feeding of the sow and by providing clean surroundings for the pig. The treatment of seriously infected pigs is scarcely worth while; even if they recover, they are not likely to be profitable, and since the owner has but little feed in them

*Notes from an address by Frank Breed, Lincoln, Nebraska, at the Eighth Annual Post-Graduate Short Course for Veterinarians, Michigan State College, East Lansing, January 26-30, 1931.

at this time, attempts to save them are hardly justified. However, subcutaneous or intraperitoneal injection of quantities of the mother's blood appears to be the best treatment. Next in value is anti-calf scour serum, and this, in fact, works very well. Normal horse serum is apparently helpful, but is nowhere near equal to anti-calf scour serum, or to the mother's blood, as a treatment for pig typhoid.

Anemia of Suckling Pigs

Two other ailments, both nutritional, affect pigs. The foundation for them is laid in the first four weeks of the pig's life. I refer to rickets and anemia of suckling pigs. The latter is due to a lack of hemoglobin in the blood and is characterized by fatty degeneration of the liver and other tissues and enlargement of the heart. It is accompanied by a high mortality, and pigs that recover are apt to prove unprofitable animals.

Anemia of suckling pigs is peculiarly a disease of animals that are housed and raised on floors, either concrete or wooden. It does not occur in pigs that run out of doors. It is due to lack of iron in the diet or a lack of capacity to use the iron, due to an exhaustion of copper stored in the pig's liver at birth.

Prevention lies in supplying a small amount of copper and iron for pigs that are housed during the first weeks of life. Rapid growth is a predisposing factor, and thus the feed and weather enters in as a contributing cause, as does also lack of exercise. Experienced swine raisers say that it can be avoided in early farrowed pigs by providing forced exercise. It is seldom seen in pigs of gilts or mature sows that are poor milkers.

We are agreed that the pathology of the disease consists of fatty degeneration of the liver and other tissues, of enormous enlargement of the heart and an extremely low hemoglobin content in the blood. It is agreed that the symptoms are thumps, pale mucous membranes, easy tiring and sudden death, or unthriftiness. It is agreed that it occurs chiefly in early farrowed pigs that are kept on floors and develop rapidly. It is agreed that it may be prevented by feeding copper and iron, providing exercise in the outdoors, and limiting the rate of growth.

As to the actual cause of the disease, opinions do not agree. Some hold that a lack of iron in the diet is the basic cause of the condition; others, that of a lack of copper is the cause; still others, that lack of exposure to sunlight is responsible; and others still, are just as sure that it is due to a lack of exercise, while there are those that contend the trouble lies in a too rapid growth of young pigs. However, since satisfactory methods of prevention are known, we can afford to wait for a determination of cause.

Rachitis

Rickets, like anemia in pigs, is essentially a mineral deficiency. It is due to a lack of calcium and perhaps also phosphorus in the diet, or to conditions that prevent the normal assimilation of calcium. Vitamin D, or exposure to sunlight, is essential to the utilization of calcium by the animal organism.

Prevention of rickets requires only that the pigs be given adequate quantities of calcium in their diet, which is easily provided, and that they be given sufficient exposure to sunshine, or, failing this, that Vitamin D be supplied in the feed. This can be done by feeding a small amount of cod liver oil and by fish meal and various other foods, containing Vitamin D.

The appearance of pronounced symptoms of rickets is generally delayed considerable beyond the suckling period in a pig's life, but the foundation for it is believed to have been laid sometime before symptoms appear. An arthritis, due usually to pyogenic organisms, is prone to occur as a complication of rickets, and the lameness and swelling of the joints, resulting from this, is apt to be the only symptom noted by the swine owner, who thus doesn't suspect that his basic trouble is one of mineral deficiency.

Osteomalacia

Osteomalacia, appearing usually in half-grown or older pigs, is a form of rickets, in which, in addition to the calcium deficiency, there is a phosphorus deficiency, as well. Posterior paralysis of sows is just usually another manifestation of this same calcium deficiency. In other words, it is another form of rickets, and the means of prevention are the same as for prevention of other forms

of rickets; that is, supplying the animal with an adequate quantity of calcium in its feed, and providing vitamin D, or ample, direct sunshine, and perhaps, also, phosphorus, to enable the animal to utilize the calcium ingested. One of the most convenient vehicles for supplying the calcium is steamed bone meal. Vitamin D, as previously mentioned, is most conveniently furnished in cod liver oil.

Hog Cholera

If the sows have been immunized against hog cholera, this disease is not considered a serious hazard of the young pig. Pigs farrowed by immune sows possess a considerable resistance to cholera. This resistance continues in lessening degree for several weeks. For this and other reasons we have come to regard the best time for vaccination of pigs to be about weaning time. It makes no difference in the production of immunity, whether the pigs be vaccinated a few days before they are weaned or a few days afterwards. Many have had success in vaccinating very young pigs, but results of such vaccination are not constant and baby-pig vaccination has never become generally popular.

Uncomplicated hog cholera offers no serious problem in its control; but the disease is prone to be complicated with suipestifer infection, and then vaccination with serum and virus alone is not sufficient. In fact, the use of virus in pigs suffering from a low form of suipestifer infection, is about the best known means of setting off an intestinal enteritis, with resultant heavy losses.

It is considered far better to treat the existing infection and postpone vaccination until the suipestifer infection is overcome; or, if the danger of cholera is imminent, to use serum alone, and revaccinate with serum and virus a little later on.

The following line of treatment is regarded as an efficient one for handling this condition. Withhold from the diet all corn, tankage, barley, rye or wheat. Place the animals on a diet, which consists of whole oats, soaked in an alkaline solution. This should be fed night and morning. Also, permit the animals to have a slop, prepared from sweet skimmed milk, if possible; otherwise, water; but do not use sour milk or concentrated buttermilk. To the milk or water should be added shorts, bran or middlings. This also should be fed night and morning. The oats, soaked in the alkaline solution, should be fed first, and followed by the slop, in each instance.

This treatment should be continued for a period of approximately ten days, or until the digestive disturbances of the animals have corrected themselves. Then this form of feeding should be reduced to once daily, and then the regular ration of corn and tankage may be instituted. But, in this instance, it is advisable to start these animals on corn and tankage, together with other supplements, the same as though they had never had access to this diet; gradually increase the quantity of this diet until the animals are on full feed, at about 30 days after starting the alkaline treatment.

The use of suipestifer bacterins as a supplementary treatment to the properly adjusted diet has given satisfactory results, although herds may recover without the use of a biologic product. But the time element in arresting the original disturbances, together with protecting the herd against breaking again with this disease when on full feed, justifies the use of the bacterin. If cholera does not appear in the herd, it is advisable to wait for a period of seven to ten days after the herd has completely recovered, and is back on its normal ration, before attempting serum-virus administration. At the time the serum and virus is administered, the ration should be withheld, and the animals placed on pasture, if possible, for a period of approximately seven days following vaccination.

It should be remembered that nothing else will break down the immunity to hog cholera that results from proper vaccination with serum and virus, so quickly and so completely as suipestifer infection. Animals suffering from this infection are not immunized against hog cholera by the administration of serum and virus; and animals that have been properly immunized, have their resistance to hog cholera very much lowered by a subsequent attack of suipestifer infection. There appears to be some close, but not understood, connection or relation be-

tween the filtrable virus of hog cholera and the *B. suipestifer*.

The theory, "once immune always immune to hog cholera," is wrong. There are conditions that will break down this immunity. Suipestifer infection has been mentioned as the most effective in breaking down immunity to hog cholera, but there are others. A heavy parasitism will lower the resistance to hog cholera; so will heavy feeding on green corn, and, where a combination of two or more of these conditions prevail, the fact that an animal has been properly vaccinated against hog cholera, should not prevent us from suspecting that disease and looking for it.

EXAMINING BOARDS NEED MORE DISCRETIONARY POWER

Recently I have been reading in VETERINARY MEDICINE, discussions on the subject of the veterinary examining board. In a measure, I agree with E. J. F. (page 120, March issue of VETERINARY MEDICINE) that veterinary examining boards should be preserved.

I feel that if a man attends a recognized veterinary institution, makes satisfactory grades, and is granted a degree by the faculty of such an institution, it is nothing short of travesty to ask that man to write an examination given by men who are in most cases middle aged and have been out of school for a good many years. So, in that respect, I am forced to disagree with E. J. F.

It would appear that the chief function of a veterinary examining board should be to ascertain a man's qualifications and fitness for the right and privilege of being granted a license to practice his profession. Certainly it is not essential for such a board to go through the formality of holding a written examination, in order to obtain such information.

The province of a veterinary examining board, as I understand it, is to offer such protection as it may to the live stock industry of the state. The fact that this is a protection also to veterinarians already licensed in the state and an advantage to qualified men everywhere, which it is, is incidental.

It appears that a good many veterinarians take a different view of the purpose of the board and think that the veterinary examining board is for the protection of the reputation of the profession, and to limit unfair competition for qualified, ethical practitioners.

A board that functions properly does both of these things in large measure, but as I see it, by indirection, and this brings criticism from members of the profession who would like to see these things accomplished directly and expeditiously. So should we all; but the veterinary practice acts, at least of most states, does not contemplate advantage for the qualified veterinarian, but protection for the live stock industry. Such being the law, the examining board must be governed by its provisions.

The case mentioned by E. J. F. is merely a grand illustration of American politics, and if the gentleman in question is anything like most political veterinarians whom I have come in contact with, he could have eaten up any set of papers handed him, and would have obtained his license, and consequently the position, just the same.

Furthermore, because a man is capable of writing a good examination, is positively no criterion that he has one lick of sense in applying the knowledge he theoretically possesses. Some of the biggest "lunk-heads" whom I have ever come in contact with, were men fluent in speech and gifted with the pen, while many successful professional men in all walks of life are incapable of expressing themselves in public and utter failures in composition.

Yes, I am in favor of preserving Veterinary Examining Boards, but I think it the duty of state legislatures to dissect the burlesque features from them, and grant all boards the power of licensing by reciprocity, or, at the election of the board, to grant licenses to graduates of recognized institutions, when, in their judgment, such action is warranted, and not in direct conflict with the rules of professional ethics.

In some states it is a different story, as, unfortunately, anyone can take our board—the law prohibits discrimination.

H. A. W.

Swine that recover from infectious necrotic enteritis in which destruction of the intestinal mucosa has occurred, frequently are unthrifty and do not fatten because of impaired function of the bowel. The degree of unthriftiness may parallel the extent of mucosa destruction. This condition is relative persistent because of the limited regenerative capacity of mucosa epithelium.

One hundred and fifty cases of snake poisoning in humans occurred in Texas from July 1926 to June 1927. Of 83 cases that were treated with antivenim, five died and 23 of the 67 cases in which antivenim was not used died. Thus approximately 94% of the antivenim treated cases recovered and only 66% of the untreated cases.—Bio. Abs. 1375, 1932.

Strangles is a specific infective disease caused by a streptococcus. This streptococcus apparently has a specific affinity for the nasal and pharyngeal mucosa. The strangles streptococcus should not be confused with the *Streptococcus pyogenes equi*, an organism that produces pyogenic infection in horses and mules. Vaccination with a bacterin prepared from strangles streptococcus is a preventive.—Zlatogoroff, Kandyba, Sadowsky, Bio. Abs. 28249-50, 1931.

THE VARIABLE TUBERCULOSIS GERM

Ralph Mellon, Western Pennsylvania Hospital, Institute of Pathology, Pittsburgh, announced to the Society of American Bacteriologists, meeting in Baltimore, that the tuberculosis germ has a double life and can shrink itself into a dwarf form, beyond the visibility of ordinary microscopes. This announcement was made on approximately anniversity of the discovery of the tubercle organism by Koch.

This new chapter in the life cycle of the microscopic bearer of the great "white plague" may explain the disputed action of BCG, the living vaccine against tuberculosis developed in France, and it may throw light on ills similar to tuberculosis, such as Hodgkin's disease.

Doctor Mellon found that ordinary tubercle bacilli, which are slender, rod-like organisms, may develop under suitable living conditions into granules, which have much less ability to produce the disease. These granules are ultramicroscopic and pass through the finest filters, but may be brought back to a visible form on proper media. The ordinary germs are called acid-fast, because they retain a red stain, even when washed in acid, and the granules are also acid-fast. The granules, in turn, may develop into the ordinary acid-fast, virulent tubercle bacilli, or they may develop into other bacilli, which are not acid-fast and not virulent, and which Doctor Mellon finds look like the bacilli that cause diphtheria.

The existence of such a minute, filterable form of the tuberculosis germ has been the subject of scientific controversy for nearly a decade. No one, until this time, has succeeded in cultivating it from a growth of a single bacterial species.

Doctor Mellon warned that, even though the familiar form of the tubercle bacillus may disappear from the tissues of the body, danger still threatens the patient from the possible unsuspected presence of one of the variant forms of the germ, which may at any time develop disease-producing powers.—*Science-Supplement*—Vol. 75, No. 1932.

LEG INJURY IN A COW

Broken legs and lameness in cattle caused by kicks of other animals, are quite familiar to veterinarians. Occasionally, however, one meets a case that requires all the skill and judgment at one's command, to diagnose and treat successfully. Such a condition was recently presented at the veterinary clinic at the Kansas State College.

A fine Jersey cow was brought to the clinic with a history of having been kicked by a horse, on the lateral aspect of the left hind leg. The cow had been down since receiving the kick. The leg was slightly swollen and from all appearances and from the history given by the owner, it looked like just another case of a broken leg. The leg was firmly palpated but no evidence of fracture of the tibia or metatarsus could be found. Feeling certain that no bones were broken, the superficial digital flexor tendon was next examined as there was a possibility that this tendon was torn loose from one of its attachments, but after a careful and complete examination, no abnormality in it could be found.

By the process of elimination the case was diagnosed as a ruptured muscle and an unfavorable prognosis was given to the owner. Since a slight swelling occurred over the gastrocnemius muscle, it was believed that this muscle was ruptured, and also possibly the deep digital flexor muscle.

A quart of serum was drained from the swelling and the animal was allowed to rest for a week. A fifteen-minute daily massage of the muscles in the injured region, was given, in the hope that with careful nursing the cow would recover. At the end of the week, the swelling had gone down but the animal made no effort to rise to her feet. Daily massage was kept up for a week longer, at which time she would rise to her feet, but would walk on the tarsal joint of the injured leg and then for only a short distance. In a short time, she would be down again, making no effort to rise.

After two weeks' observance, it was decided she should be destroyed, since she had fallen off to a great extent in weight and the affected leg appeared to be worse.

Upon postmortem examination the medial and lateral heads of the gastrocnemius muscle were found to be ruptured, the rupture involving only the two heads of the gastrocnemius muscle. While the treatment was simple, it probably was about all that could have been done for the condition.

Richard H. Jurden,
Manhattan, Kansas. K. S. C., '32

HEMATURIA IN STEERS

About the first of November a Missouri cattle feeder purchased a string of Texas and New Mexico grade Hereford yearling steers. They were run on blue grass pasture to acclimatize them before putting on full feed.

After having been on full feed for about six weeks, one steer died and within ten days, two more were dead. The principal symptoms were dullness, paleness followed by icterus of the visible mucous membranes, and bloody urine. The affected steers became very weak.

A partial autopsy was held on one of these steers within a few hours after death. The outstanding lesions consisted of a parenchymatous nephritis. The bladder was practically filled with a clotted mass of blood, and the bladder mucosa evidenced extensive hemorrhagic areas. The bladder appeared much the same as the photos and plates illustrative of the Pacific Northwest disease called Bovine Red Water (December, 1931, issue of VETERINARY MEDICINE, pages 476-481). The carcass was almost bloodless and the fluid in the vessels was pale and scarcely soiled the hands during the autopsy.

Careful laboratory tests were made. The red blood corpuscles were not normal, but no intra-corpuscular parasites were visible. This condition has been reported in two other herds of cattle in the Central West within the last three or four months.

This malady has some similarity to bovine red water, anaplasmosis, and ictero-hemaglobinuria but there are many differences.—A. T. K.

Gastroscopy and Esophagoscopy in Dog Practice*

By Prof. Dr. W. Hinz, Berlin, Germany

COMPARED with its use in general medicine, the practice of endoscopy in veterinary medicine is of recent origin. It is true that we have records of a few cases, dating way back to 1888-1889, when, with the aid of special instruments, certain experiments for the diagnosis of diseases of the larynx were made. However, only the very recent experiments, made with the aid of entirely newly devised instruments, laid the foundation for the practice of rectoscopy, cystoscopy and larygnoscopy of small animals.

So far all attempts to perform an endoscopy of the stomach of larger domesticated animals has remained unsuccessful on account of the many technical difficulties encountered. Similarly, with smaller domesticated animals only recently were experiments made with the endoscopy of the esophagus and gastroscopy in dog practice.

The first description is given by Horning and McKee (1), followed by Myers and Darling (2). After careful reading of the above mentioned reports Vauthrin (3) began a study of the question of endoscopy of the smaller domesticated animals. This author considers esophagoscopy especially useful in cases, when either no X-ray apparatus is available or, when the substance of the foreign bodies would not show distinctly on the X-ray picture. The instruments used for the performance of esophagoscopy vary greatly, but their basic principle is identical. Vauthrin prefers Clerf's bronchoscope combined with an atomizer, with which fluid medicines can be sprayed locally and with which a therapeutically favorable inhalation can be effected.

Krumhaar and Tucker (4) succeeded with esophagoscopy on a dog in making a correct diagnosis and removing a piece of bone wedged in the esophagus. They do not describe the instruments used, but Suchanek (5) thinks that they used the instruments of Jackson. Buckingham (6) with the aid of a bronchoscope used in general medicine was able to prove a perforation of the pharynx on a dog and ordered the killing of this animal.

According the experiences of Aubin (7) the use of the endoscope for the examination of trachea, bronchi and the esophagus for a correct diagnosis will give excellent results. However, this author is very emphatic about the difficulties to be encountered in many cases. He especially recommends the instruments of Bruning and of Chevalier Jackson, because in these models the tubes to be introduced are provided with small forceps, with which the foreign bodies may be seized and removed. Secretions may be removed with the aid of a special tube. The Jackson models permit in addition the application of disinfectants and the use of gaseous medicines for narcotics.

Sartorius (8) considers the esophagoscopy of dogs indispensable for a correct diagnosis and as an aid in therapy. He recommends the instruments of Jackson and Bruning in accord with Vauthrin and Aubin. These instruments have many defects, according this authority and their improvement is desirable.

In 1928 through the thorough experiments of Suchanek (5) a further advance was made in the use of esophagoscopy in dog and cat practice. According this author the introduction of the instrument in these animals is comparatively easy and not at all dangerous. Endoscopy is indispensable for the diagnosis of all cases which will not show on X-ray pictures. In cases of tumors, diverticulum, stenosis or similar conditions endoscopy is the only available means for the making of a correct diagnosis. In cases of foreign bodies in the throat it will determine their size, location and substance and

*Translated by Mr. Alex Schreiber.

thereby will aid greatly in the proper therapy. To accomplish successfully an esophagoscopy a general anesthesia is required, care being taken, that narcotics, which cause vomiting, should not be used. Only in a very few special cases may general anesthesia be dispensed with. The instruments used by Suchanek consisted of a Kahler-Leiter panelectroscope with cabel and reserve lamp, four slide-tubes of Haslinger with extension tubes, forceps, pliers and tweezers, saliva pump with two pump tubes and receptacles. For the removal of tightly lodged foreign bodies a dilating esophagoscope by Bruning is recommended.

Suchanek (9) has used esophagoscopy on 23 dogs since 1928. Seven cases died; one was killed by request of its owner; one dog died of the narcosis; two dogs bled to death due to the extraction of extremely large foreign bodies; in two cases perforation of the pharynx took place; while the seventh case was that of a dog, which swallowed a spool of thread and the thread cut the small intestines of the animal. All the other cases were cured through the result of esophagoscopy.

The articles mentioned so far treat mainly with the esophagoscopy of dogs and cats. Gastroscopy is mentioned by Horning and McKee and also by Vauthrin; but the cases mentioned have only an experimental character, and cannot be considered final for the practical results of gastroscopy.

The first to gain experimental knowledge of gastroscopy on a larger scale in the smaller domesticated animals was Unterspann (10), who was induced to undertake these experiments by Hinz, in whose clinic they were accomplished.

According Unterspann gastroscopy should be resorted to with dogs with a history of long standing stomach trouble and especially when there is a foreign body suspected. In such cases gastroscopy is the only available means for a correct diagnosis. Only by the aid of this procedure will it be possible to determine with accuracy the size, location, substance, etc., of the foreign body and this knowledge in turn is the prerequisite of a successful therapy. But the *difficulties* to be encountered in the performance of gastroscopy on dogs, according Unterspann, are quite considerable. The canal, which consists of mouth, throat, larynx, the entrance to the stomach and the stomach with the pylorus, must be brought in a straight line. Therefore the introduction of the instrument may cause severe injuries in many cases. It was possible with human patients from the very beginning to accomplish a good gastroscopy either with the aid of local anesthesia of the mouth and the upper part of the larynx or quite often with general anesthesia. This however, is not the case with dogs, where the introduction of the gastroscope and a correct observation without general anesthesia was *impossible*. Fear and a feeling of uneasiness cause the animals to ward off, to wriggle, and their constant body movements will prevent a thorough and correct observation.

After many experiments with other systems Sternberg found the gastroscopy the most useful. The introduction of this instrument in the dog's stomach can be accomplished easily. The great power of the introduced light makes the field of vision very clear and will allow of perfect observation of every essential detail. He uses either olive or ricinus oil for the introduction of the instrument. The introduction of the gastroscope should be preceded by a thorough probing of the entire canal in order to determine, whether or not the canal is obstructed by a foreign body. Such a previous probing will greatly diminish the dangers of gastroscopy.

After becoming familiar with the gastroscopic picture of the mucous membrane of the normal stomach, it will not be difficult to detect even the slightest pathological changes present. A visible paleness of the normally bright red mucous membrane of the stomach is an indication of achylia gastrica, in which case the stomach secretion ceases. A pronounced redness of the mucous membrane is an indication of dyspepsia acida. In many cases of hyperacidity slight, circumscribed erosions may be found. The atony of the stomach can be recognized by the slackness of the walls in which case the folds of the membrane are hardly visible.

Invariably a large amount of food residue can be found in the stomach in the latter cases. But the very best field for the use of gastroscopy on dogs is always the proving or disproving of the presence of a foreign body.

Often palpation or Rentgenoscopy will determine the seat and size of the foreign body, yet, in numerous cases, these means will be found inadequate. In all the above mentioned pathological cases gastroscopy will be found of the greatest importance for the making of a correct diagnosis. However, we have also to consider, that its performance is sometimes impossible. In cases of aortic eurysma, strictures of the esophagus, severe heart diseases, highgrade dyspnea or in cases of severe bleeding the introduction of the gastroscope cannot be resorted to.

Conclusions

Following these very thorough experiments of the above named authors we can confirm, that endoscopy, esophagoscopy and gastroscopy in dog and cat practice is possible, and that quite a number of instruments are available in order to accomplish this, recommended procedure for diagnostic and therapeutic reasons.

How shall the universal use of endoscopy in the recommended cases be viewed by the practising veterinarian? Besides the numerous contra-indications for the accomplishment of these arts of endoscopy, reported directly by Unterspann, many obstacles are in the way for the acceptance and universal use of these methods.

One of the greatest disadvantages is, that animals have to be given a general anesthesia, which at least in the case of dogs, results in a high number of fatalities. Among the 23 cases mentioned by Suchanek one resulted in death, attributed directly to the narcosis.

Another obstacle, at least in Germany, and since the world-wide depression perhaps in America too, is the high cost of the instruments to be purchased by the practicing veterinarian, especially, if we consider, that for the various larger animals he will have to order two different sets of large sized instruments.

Moreover, the cases in which endoscopy is *actually* and *inevitably* necessary are not very numerous. They will never repay the cost of the instruments even in the case of an unusually large practice. From among cases mentioned by the foregoing authors in which endoscopy is indicated we will take the cases of tumors, diverticulum, stenosis and foreign bodies. Among the 61,527 dogs and cats, which were treated in the last years at the Poliklinik of the Berlin Veterinary School were found

	Tumors	*Diverti-culum*	*Ste-nosis*	*Foreign Bodies*
In the food passages ...	0	1	0	73
In the stomach	0	0	4	54

In contrast to the often observed tumors in the mouth and throat, among over 60,000 patients no tumor of the esophagus or of the stomach could be found, nor could it be detected after dissection. The same observation applies to cicatricial or compression stenosis.

It is true that a number of perforations of the esophagus were treated during the period reported, but they could be detected easily and treated successfully without the aid of endoscopy, whenever the seat of the perforation could be reached and they were not within the thoracic cavity. In a case treated by myself, where a diverticulum of the esophagus was found in a little maltese dog, I could make the diagnosis easily without resorting to endoscopy simply by means of the clinical symptoms and mainly through the aid of X-ray.

Lastly we will consider the cases of foreign bodies. They can be located by means of clinical symptoms, palpation, probing and in most cases with the X-ray. Insofar, as these cases in the esophagus as well as in the stomach can be treated and eliminated therapeutically, we are able to accomplish our purpose through the usual procedures. (emetics, esophagotomy, gastrotomy). In cases where the foreign bodies were lodged at the point where the esophagus penetrates the diaphragm, even the endoscopes provided with forceps did not prove very useful, according to Suchanek, who reports two fatalities among the small number of cases described by him, which bled to death on ac-

count of injuries received while extracting the foreign bodies.

Finally considering the other cases reported by Suchanek and others, we cannot decide, whether they could be diagnosed and removed only with these new instruments, or whether they could be removed by the other, usually practiced methods. Perhaps the endoscopic instruments were used in these cases for the sole purpose of proving their usefulness in such cases.

The main purpose of the experiments conducted by Unterspann was to prove the practical use of these instruments. This was successfully accomplished and the most suitable cases were used for this purpose, without however barring entirely in such cases the usually practiced methods. Even in general practice in Germany, as far, as I an informed, gastroscopy is not in universal use, is not unanimously considered as free from danger, nor is it considered indispensable. According to my experience I would by no means recommend the practitioner to acquire these expensive instruments, though I do not deny, that in exceptional cases the gastroscope may be of very great value.

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UNUSUAL PLANT POISONING

I would like to describe a couple of cases, which I believe are in some way connected with the fact that forage plants may become poisonous under adverse conditions.

Case No. 1.—A yearling steer, fat and ready for market, was turned out and watered. He went through a fence into a field of wheat that had been badly blown down, and then, rank second growth had followed. An hour later, the steer was found in distress, being about double normal size; not from abdominal bloat, but from subcutaneous emphysema over entire body. He died in an hour. I have never seen such extreme distention. The head and legs appeared only as protuberances on an otherwise round mass. The internal organs appeared normal, except for being possibly a little pale. There did not appear to be much blood in the body.

Two other young cattle, on a farm eight miles from this one, were found dead one morning, apparently from the same cause. The owner had mown a slough, and, passing through a field of wheat on the way to the barn, had mown a swath of wheat that had been blown down, and then came on with rank growth. This he gave to the cattle; they had eaten of it during the night, and were found dead in the morning. Older cattle on both farms had access to same feed, but were not affected.

I may say that these blown-down fields, that came on late, appeared a darker green than wheat usually grows.

Case No. 2.—Horses were fed a mown crop (wheat, green pigweed, Russian thistle, etc.). They were rather thin, but by no means emaciated. They would appear suddenly to go crazy. They would rear, squeal, break halters and batter walls with front feet. One smashed a door open and ran about a mile, and dropped dead. Four have died on this farm at different times. All showed the same symptoms and lived 30 minutes to one hour.

A diagnosis will be greatly appreciated.

H. A. Taylor,

Imperial, Sask.

Nervous Pregnancy in the Female Dog

In spite of the opinion of several veterinary authors, Taskin[1] is still persuaded that nervous pregnancy is a common phenomenon in the female dog. Due to the fact that the physical conditions are sometimes bound to the phenomenon of hydrometra or of false lactation, many veterinarians have refused to admit their reality. The writer submits a series of six observations in which it appears impossible to see anything but the analogy of nervous pregnancy frequently established by the gynecologist of human medicine.

In every case, except one, the state of hydrometra does not appear absolutely evident and even remains to be shown. Apart from these the physical signs are sufficiently evident for any confusion to be admitted.

In one case, the udder gave not even the least sign of lactation. Moreover, there was no hydrometra nor psuedo-lactation. The physical manifestations amply justified the name, nervous pregnancy. As for a physical-psychological explanation of this state, no hypothesis should be attempted until further information is available.

Let us say only that the role of the imagination, or the desire to be a mother, which causes with women the principal factors of pregnancy, called nervous, seem of little moment in the case of the female dog. For, without wishing to pretend that the animal is absolutely incapable of maternal desire or of imagination, there is slight logic for saying that these states are susceptible, in themselves, of causing the objective manifestations that we report in the following observations:

Observation No. 1.—Lulu, a Pomeranian, eight years old, belonging to Madame Rodriquez, 20 rue Legendre, Paris.

This female dog first came in heat at the age of eight months and estrus recurred thereafter regularly every six months. She was not mated and there were no abnormal manifestations other than a slight secretion of the mammae. But the fourth and each succeeding heat period was followed two months later by maternal manifestations. Thus two months after the fourth heat period, she adopted a rag, which she lodged against her abdomen, licked, and upon which she bestowed all the solicitude that female dogs ordinarily reserve for their young. At the approach of strangers, this dog, habitually of a sweet and docile disposition, manifested signs of lively resentment, and even savagery.

At 34 months of age, the same phenomenon was repeated, except that this time a slipper was the object of maternal affection. At the next heat period, this bitch was mated and raised four puppies, normally. Two months following each of the next six heat periods, at none of which the animal was mated, she went through the manifestations of suckling and caring for a litter of puppies; in each instance a slipper constituting the embodiment of the absent offspring.

In this case, we unmistakeably have nervous pregnancy with pseudo-lactation, but no hydrometra.

Observation No. 2.—Pucette, Pekingese, four-and-one-half years old, belonging to Madame Portalé, 10 rue St. Valentine, Paris.

This female dog, the mother of two litters, which she raised perfectly, was mated October 21st. At the end of a month an increase in the size of the abdomen led us to believe that a normal gestation was progressing. December 21st, we were called to see the dog, which presented signs of nervousness. At the time of our examination, the abdomen was slightly enlarged. The uterus was a little distended, but did not contain any fetuses. The mammae were slightly congested and a liquid gushed out on manipulation. The dog let us approach her bed reluctantly, acting as if guarding an imaginary litter.

This was a case of nervous pregnancy and pseudo-lactation, with hydrometra.

Observation No. 3.—Soda, Scotch terrier, seven years old, belonging to Madame Guerin, 34 rue Desbordes, Valmores, Paris.

[1] Taskin; Quelques Cas de Grossesse Nerveuse Chez La Chienne; *Revue de Pathologie Comparée et D'Hygiène Générale*; 5-20, November, 1930, pp. 1148-1152. Abstracted by J. G. Horning.

This female dog had been regularly in heat, from the age of seven months, but had never been mated. In January her abdomen increased noticeably in volume and lactation began. At the end of several days she became nervous, feverishly running about the apartment, as if she was seeking lost offspring. This state lasted two days, and then she adopted a doll, upon which she lavished maternal affection.

This was manifestly a case of nervous pregnancy, with pseudo-lactation. There was no hydrometra.

Observation No. 4.—Toupie, Fox terrier, nine years old, belonging to M. Cudorge, 4 rue Nelaton, Paris.

This female dog was in heat for the first time as six months of age. These heat periods occurred thereafter regularly twice a year. She was not mated. Nevertheless, two months after each period she passed three or four days apparently diligently seeking little ones she had never had. In time this hallucination passed spontaneously, without the adoption of any object to serve for puppies. This crisis was accompanied in each instance by slight pseudo-lactation.

The diagnosis was: nervous pregnancy, with psuedo-lactation, but without hydrometra.

Observation No. 5.—Cruche, Cairn terrier, ten months old, belonging to M. Max Decugis, 30 rue des Perchamps, Paris.

January 20, 1930, at the age of eight months, this female dog was in her first heat and was not mated. March 17th, she was attacked by a serious angina, which lasted until the 24th. At this date, she adopted a little rubber dog, which she carried to her bed with the same precautions that she would a new-born puppy. She placed it against her abdomen and gave the appearance of nursing it, although the mammae did not present the least sign of lactation. The uterus was absolutely normal. The cervex was impermeable. There was no discharge from the vulva.

This must be conceded to be a case of nervous pregnancy, without pseudo-lactation or hydrometra.

Observation No. 6.—Draga, Briarde, two years old, belonging to Mlle. Germaine Lecomte, Les mousseux (S et O).

This dog was regularly in heat from the age of seven months. She was mated on December 16th. During the first fifteen days of February her abdomen increased noticeably. February 17th, just 63 days after she had been bred, she made a nest in straw, and became anxious. The mammae were congested and a small amount of an aqueous-like solution exuded from the teats. Two days later, the state of the dog became disturbing. She manifested signs of disquietude, succeeded by periods of low spirits. The appetite was in complete abeyance. There was a slight discharge from the vulva. A colleague, called to visit the dog, experienced difficulty in palpating the abdomen, because of its plumpness and also because of the indocility of the patient. The temperature was 39.5° C. (103.° F.). The veterinarian, being in doubt as to the unusual condition, called the author in consultation. The uterus was slightly augmented in volume, but absolutely devoid of fetuses. The cervix was dilated with ease.

It was concluded that the condition was one of false gestation, accompanied by a light state of hydrometra. As a precaution, the dog was taken to our clinic, where she underwent an X-ray examination. No fetus was discernible. The injection of "collargol" into the cavity of the uterus showed it to be absolutely normal. The temperature fell little by little, till it reached 38.2° C. in one week. At the same time, signs of the pseudo-maternity anxiety disappeared, and the dog resumed her normal character.

In this case we have nervous pregnancy, with pseudo-lactation, and slight hydrometra.

Discussion

M. le Prof. Robin.—I am entirely in accord with our colleague in believing that the phenomena of imaginary gestation, which he has observed in connection with the female dog, is not a psychical aberration, but was simply an endocrinous aberration, and very probably due to irregularity in the functioning of the ovary.

But, I am inclined to think that it is also well to consider as manifestations of this

paradoxical pregnancy those lactations which come so often two months after a period of heat, whether or not there was mating. If, in these heterochronous lactations, the physical element is generally absent, one would not know how to seek another explanation for them, the mechanism than that to which I have alluded.

M. Bouchet.—We have observed this milky secretion many times. It is very common, but I do not consider that as nervous pregnancy. When the character of the animal is modified to a degree that it becomes vicious, that is another matter.

M. Lermat.—These phenomena are produced in all species of animals. In goats, the condition is very well known. The goat herds whip the udders with nettles and sell the animals as good milkers. The buyer is, of course, defrauded.

M. H. Legrand.—The milky secretion is almost constant. I have seen female dogs of strong temperament and of a docile character adopt little ones and become good nurses.

M. Naame.—These cases may be added to endocrine phenomena, since, with a pregnant woman, there is a suppression of the rules.

M. le Pr. Maignon.—It is difficult to establish a precise demarcation between the psychical phenomena and endocrine aberrations. It suffices to recall the works of Pawlof on the psychical secretion of gastric juices. One can infer only, that a phenomenon is not of a psychical nature when one observes it in the female dog. The dog is an animal to which one is not able to deny either reasoning or affection.

PECULIARITIES OF THE CIRCULATION OF THE MYOCARDIUM OF THE DOG

According to the *American Heart Journal,* the coronary arteries of the dog differ from those of man in two principal points; the presence of a distinct septal artery, coming from the left coronary and the beginning of the posterior artery descending at the expense of the left in every case, whereas in man this latter condition occurs in only 20%.

Anastomoses between the coronary arteries and their branches are very abundant in the heart of the dog.

THE ACTION OF ANCYLOSTOMA IN DOMESTIC ANIMALS

Cbouzel[10] states that the remark, "That there are not any illnesses, but only sick persons," has become a living aphorism, which he verified by noting the effects of intoxication on three cats that were given spoiled meat, containing ancylostoma.

Twelve hours later the effect was manifested by a glairy vomiting, containing bile and living worms, general organic weakness, notable lowering of the temperature, and death of the three cats 24 hours later.

The reactions were different enough in each of the three animals (two had convulsions two or three hours before death) to confirm the above aphorism. Nevertheless, he gives gastric intolerance as the key symptom in ancylostoma toxemia, and the condition as rapid and fatal.

He gave tercinol in drops to these cases, but it gave only a slight semblance of checking the fatal progress of the condition.

RABIES INFECTION SPREAD BY YOUNG PUPPIES

A fox terrier gave birth to a litter of six. When the puppies were about four weeks old, the mother became ill, and, according to the owner, acted like she had a bone in her throat. A few days before she died, she began to snap at the puppies. The owner thought she was trying to wean them, and, after she died, gave four of them to his friends. Very shortly all of the puppies began to bite everybody and everything.

A brother of the owner of the sick dam called me. This was four or five days after the first member of his family had been bitten. I advised an immediate microscopic examination of the brains of two of the pups. My diagnosis of rabies was confirmed by the laboratory. The man at once went into high, as all his family and himself had been bitten.

Altogether, 42 people took the Pasteur treatment, as a result of being bitten by these puppies. One of the children that had been bitten, had a high fever for several days, and

[10] Cbouzel, Dr. E., De l'action de l'ankylostome sur les animaux domestiques. *Revue de Pathologie Comparée et D'Hygiene Générale,* Feb. 1932. 173-174. Abstracted by J. G. Horning.

complained of a tight feeling in her throat. She finally recovered. A case of rabies had developed in the neighborhood about two or three months before all this happened.

One of my instructors at college, some twenty years ago, said that most of us would live to see the time when rabies would cause us a lot of trouble. The old doctor, now dead, was right, so far as I am concerned.

R. R. Chew,

Covington, Ind.

LOSS DUE TO SWINE POX

A swine disease that is apparently different from any disease that has previously occurred in this community is causing considerable loss in swine herds in this section of the country. This condition primarily affects pigs and shotes weighing up to 75 pounds.

The outstanding symptom is a cutaneous eruption involving first and most severely the venter surface of the abdomen. The temperature of affected pigs varies from 104.5° to 106.5°F. The diet in most affected herds is corn and tankage.

What is this disease? Will it later spread to and affect the brood sows? What treatment, if any, will be of value?—J. W. C., Missouri.

Reply: Your description is quite in accord with symptoms and lesions of swine pox. Swine pox has prevailed in various sections of this country for several years. However, in so far as reports are concerned, this disease has not been serious or fatal until 1931.

Swine pox is caused by a filterable virus and, according to Bridré of Paris, this malady is specific for pigs. However, other investigators contend that swine are susceptible to the virus of cow pox. Swine pox has been observed on several farms in the last few months, but although cows were exposed to affected swine on several farms, there have been no cases of cow pox observed on these premises.

Swine pox is characterized by a cutaneous eruption that evidences a sequence of papules, vesicles and pustules. The lesion is not so definitely umbilicated in swine pox as it is in cow pox. The lesions of swine pox occur primarily on the venter surface of the abdomen, although they may occur on the ears, shoulders, etc. In the mild type of swine pox, there is no rise of temperature, but in the virulent type, that has been prevailing recently, there is a relatively high temperature. In some cases a temperature of 106° or 107° F. has been noted.

Treatment is of no avail. It is possible that a protective vaccination might be given by the use of vesicular fluid from mild cases of swine pox, as was done with small pox in prejennerian days.

Swine pox is presumably a disease of the young and probably will not affect aged brood sows. The mild type of swine pox is of little concern in itself, but not infrequently serious post vaccination difficulties occur in shotes and pigs that were given serum and virus during the early stages of the disease or during the incubation period.

Probably other factors enter into the control of swine pox, such as proper housing, feed and management.—A. T. K.

CONTROL OF SHIPPING FEVER IN LIVESTOCK

A systematic study of the causes of hemorrhagic septicemia in livestock and the value of biological products in controlling the disease is under way in several states.

The systematic study includes: (1) Vaccination of stocker and feeder cattle on the home grounds with hemorrhagic-septicemia aggressin or bacterin 10 to 30 days before shipment to market, (2) vaccination of stocker and feeder cattle with antihemorrhagic-septicemia serum one or two days before shipment, (3) vaccination of stocker and feeder cattle with antihemorrhagic-septicemia serum in the stockyards where the cattle are marketed, and (4) vaccination of young calves on the home premises with hemorrhagic-septicemia aggressin. Appropriate numbers of untreated control animals are provided in each instance.

Recent Developments in the Phenomena of Reproduction

By G. W. McNUTT, Pullman, Washington
Anatomy Laboratory, State College of Washington

GREAT advance has been made in our knowledge of reproduction during the past ten or twelve years. Investigation in various species of animals has led to elucidation in some cases and confusion in others.

It is my intention here, to discuss the relation the endocrines have to the process of reproduction, particularly in the cow, and to interpret the practical application of these relations in animal medicine. This is no easy task, as our knowledge concerning many phases of endocrinology is only rudimentary and suggestive. Many theories that have been advanced may be exploded tomorrow. While the field is highly speculative, I have made an effort to use only those theories or hypotheses that seem most plausible, and have summed them up in the accompanying chart. It is to be regretted that practically all experimental work has been carried out only on small laboratory animals, such as the rat, mouse, and rabbit. It is illogical to expect identically the same results with the larger mammals. For example, we know how much estrin is necessary to bring an oophorectomized rat into full estrus, but nobody has the slightest conception of how many of these standard rat units are necessary to produce the same reaction in the cow; it has never been worked. The primary reason for this is a disgraceful lack of support of our colleges of animal medicine. Funds are not available.

The Thyroid

The thyroid is known to influence the development of the reproductive system. Cretinism is a result of lack of thyroid development and adequate thyroxin production. Cretins manifest an infantile condition of the genital organs. Myxedema, due to disease or injury of the thyroid gland, may be accompanied by sexual impotency.

The Ovary

The functions of the ovary may be summed up as follows:

(a) Cytogenic.
   1. Production of ova.

(b) Endocrine.
   1. Stimulation and development of the tubular portion of the genitalia.
   2. Production of secondary sex characteristics.
   3. Production of estrus and the continuation of the estrus cycle.
   4. Development of the mammae.
   5. Production of a temporary endocrine gland, the corpus luteum.
   6. Inhibition of the thymus gland(?).

That the ovary is responsible for the secondary sex characteristics is an old and well-established fact and needs no elucidation here.

That estrus ceases following castration is also well-known. The genital organs atrophy and become quiescent. Estrus can again be produced, however, by the injection of a hormone extracted from the ovary. This hormone is found in the ovarian follicle, in both the wall and the liquor folliculi. The hormone has been called by about as many names as there are investigators working with it. Some of these are "estrin," "estrual hormone," "ovarian follicular hormone," "the female sex hormone," "menformon," "folliculin," "amniotin," "progynon," and "theelin." The term "estrin" introduced by A. S. Parkes is gaining favor and seems most plausible of adoption.

Estrin is found in the circulating blood of non-pregnant women for about seven days before menstruation and is found in the blood of pregnant women from about the eighth week of pregnancy to parturition (Frank[1]). Frank has developed a routine technique for detection of this hormone in

the blood of pregnant women and has used it as a clinical method to determine pregnancy. Experimental evidence points to the presence of estrin in the blood of all pregnant mammals. It is found also in the fetal placenta in great quantities, and may be extracted from certain plants. It is excreted by the kidneys, and hence, may be found also in the urine of pregnant animals.

It has been claimed by many physiologists that the corpus luteum is considered the sole source of mammary stimulation. This cannot be true because there is no corpus luteum during the last half of pregnancy in the mare, the time during which development of the mammary gland is greatest. The mammary gland has in the past been said to be stimulated to growth and development from at least three sources, the ovary, the corpus luteum, and the fetal membranes. The ovaries may be removed after the seventh month in the cow, and a normal parturition and lactation take place.

The recent work of Stricker and Grueter,[2] Corner,[3] Asdell,[4] and Evans and Simpson,[5] tends to show that the development of the mammary gland is due to the anterior pituitary, possibly after sensitization by some portion of the genital system. Asdell succeeded in bringing oophorectomized virgin rabbits into full mammary development with alkaline anterior lobe extracts, but was not able to produce any mammary development in immature rabbits. Evans and Simpson claim the presence of the ovary is necessary to get stimulation of mammae from pituitary extracts in the rat.

The Corpus Luteum

Through the periodical formation of the corpus luteum, the ovary assumes additional functions. Six functions have been ascribed to the corpus luteum:

1. Stimulation and growth of the mammary gland.
2. Sensitization of the endometrium so that, if the proper stimulus be added, it will throw out a maternal placenta for the attachment of the fetal membranes. The normal stimulus is the fertilized ovum.
3. Inhibition of the ovary, by prevention of ovulation and the estrous changes.
4. Relaxation and decalsification of the pelvic girdle toward the end of pregnancy (?).
5. Rhythmicity of estrus cycle (cow) as a result of 3.
6. Continuance of early pregnancy, probably as a result of 2 and 3.

The first of these would seem to be somewhat shaken by recent investigation as already mentioned.

The function of sensitization of the uterine mucous membrane is so well known as to require little or no argument in its favor. It was first postulated by Frankel and has been substantiated by every worker since. It is a well-known fact that oblation of the corpus luteum in early pregnancy results in abortion. Corner and Allen in 1930 extracted a substance from the corpus luteum by which they were able to secure normal implantations and pregnancy culminating in a normal parturition in rabbits which had been oophorectomized just after impregnation. Mammary development, however, did not take place, but by the injection of anterior lobe extracts normal mammary growth was brought about. Corner and Allen have termed this corpus luteum substance "progestin."

Ovarian activity and ovulation are inhibited by the presence of the corpus luteum. This applies to practically all mammals studied except the rat and the mouse. Papanicolaou[6] succeeded in preparing an extract of corpus luteum by which estrus could be prevented for long periods, in a normal guinea pig, by daily injections. Parkes[7] has also thrown much light upon the estrus inhibiting power of the corpus luteum. Many investigators working on the luteinizing principle of the anterior pituitary have also substantiated this theory.

The removal of the corpus luteum in the cow ten days or so after estrus results in the appearance of another estrus in two to three days. This question was asked by a person who has done a great deal of work with sterile cows, "Will you explain this condition: we find a great number of cows

which are coming in heat regularly, but have a retained corpus luteum; we remove the corpus luteum, the cow comes in heat in a few days, breeds and conceives." This condition never existed in a cow because it is a physiological impossibility. A cow with a retained corpus luteum does not come in heat; the corpus luteum inhibits heat. The very fact that a cow is coming in heat regularly absolutely eliminates the possibility of a retained corpus luteum.

What causes the rapid involution of the corpus luteum when pregnancy does not take place? This question is as yet unanswered, but we may be able to advance certain hypotheses from clinical manifestations. Loeb,[8] and Asdell,[9] working with the guinea pig, have removed the entire uterus and found that the corpus luteum remained fully developed for long periods of time; Loeb found in the guinea pig as long as 60 to 80 days. However, he found that if a small portion of the uterus were left intact the corpus luteum promptly disappeared. Long and Evans, [10] with the rat, and Hartman,[11] with the opossum, failed to confirm these views.

Clinical evidence points strongly to the uterus being a factor in bringing about rapid involution of the corpus luteum. When the uterus is diseased, or is occupied taking care of a fetus, the corpus luteum remains fully developed. In the case of a mummified fetus, the corpus luteum may remain fully developed for years. No sexual activity takes place. Simply remove the corpus luteum from the ovary and the uterus will empty itself of its burden in 48 to 72 hours, and a new cycle will start. In cases of pyometra, the same phenomenon takes place. The corpus luteum is the stumbling block. It seems at the present time that its inhibition of ovarian activity is responsible for this action.

Another point of clinical significance is brought out by the above. Many times a veterinarian is called to see a cow which the owner claims has calved about 60 days previously and has not been in heat since. Inquiry will reveal that there has been no bull on the place or that the cow has been kept quite removed from one during the period of question. Examination reveals everything normal with a corpus luteum in one of the ovaries. The uterus has undergone complete involution; at first it seems quite placid, but rapidly gains tone as it is handled and soon becomes turgid. Such an animal is perfectly normal and has passed through a heat period since parturition unknown to the owner. Many veterinarians assume that the corpus luteum found in the ovary is a retained corpus luteum of pregnancy. Such a conclusion seems to the writer unwarranted, as there is, to date, no evidence to show that a corpus luteum is ever retained following parturition.

The fact that the cycle may be broken in the cow by removing the corpus luteum together with the abundant clinical evidence of the sexual inhibition resulting from the retention of the corpus luteum would seem to be sufficient evidence that it is responsible for the rhythmicity of the estrus cycle in the cow. The corpus luteum is apparently not operative in this respect in the rat and the mouse nor in those animals which exhibit only one to two heat periods per year.

Hisaw[12] claims to have found another substance in the corpus luteum, responsible for the decalcification and relaxation of the pelvic girdle toward the end of pregnancy, "relaxin." Before this substance is operative a sensitization has to take place. This sensitization is said to be accomplished by the hormone estrin. This substance, if operative in the mare, must come from some other source, as there is no corpus luteum at this time (Aitken,[13], Kupfer,[14] Cole[15]).

The Pituitary

The action of pituitrin is so well known as to need no mention here; therefore, it is not necessary to discuss the posterior lobe of the pituitary.

Smith[16] claims the posterior pituitary nonessential to normal pregnancy and parturition in the rat.

Of the ten physiological functions which have been claimed for the anterior pituitary, six might be mentioned here in relation to sex:

1. Thyroid activation.

2. Growth promotion.
3. Maturition of ovarian follicles and ovulation. (Sex stimulating.)
4. Luteinization of ovarian follicles.
5. Stimulation of mammary growth and lactation.
6. Initiation of menstruation in primates.

Evans and Long,[17] in 1922, proved the existence in the anterior pituitary of a growth-promoting substance. At the same time they discovered the existence of a hormone which produced luteinization of the ovarian follicles.

Smith and Engle,[18] as well as Zondek and Ascheim,[19] have used repeated implantation of anterior lobe and brought about an almost immediate sexual maturity in sexually immature females. There is a complete sexual maturity of all portions of the genital system, including estrus and ovulation. Superovulation occurs if these implants are made in a mature mouse. As many as 40 ova have been shed and impregnated at one time in the mouse as a result of this treatment. Hammond, Asdell, and others have shown that regardless of the amount of ovarian tissue present a constant number of ripe ova will be formed; hence, they state, that it looks like the anterior lobe substance was limited in amount. Asdell states, "There is a quantitative relation between the anterior lobe and the ovary which determines the fecundity of the species."

Fevold, Hisaw, and Leonard[20] claim to have definitely separated the luteinizing and the sex stimulating hormones. The sex stimulating principle is said to be readily soluble in water, while the luteinizing principle is but slightly soluble in this medium.

That there is a quantitative relation between the anterior lobe hormone and the genitals seems possible from the studies of Wolfe.[21] He tested the anterior lobe from hogs during various stages of the estrus cycle, with reference to the ability of extracted hormone to produce ovulation in the rabbit with the following results: 1 mg. anterior lobe tissue induced ovulation when the ovaries of the donor contained follicles 6-8 mm. in diameter and inactive corpora lutea. 20 mg. were found necessary when the follicles of donor had reached 10 mm. in diameter, and 40 mg. were necessary when the ovaries of the donor contained active corpora lutea and only small follicles.

Evidence is accumulating rapidly which tends to show that the growth hormone is separate from either the sex stimulating or the ovulation inhibiting and luteinizing hormones, but it cannot be discussed in this brief account.

The action of the anterior lobe on the mammary gland has already been discussed. Hartman,[22] claims that menstruation is definitely initiated by the anterior pituitary. Since only primates menstruate, this action is apparently of only passing interest; at least, the homology in domestic animals is as yet not understood.

Another discovery of Hartman's,[23] has revolutionized our thoughts relative to the passage of spermatozoa through the female genital tract. He has discovered that in the rat the passage of spermatozoa through the uterus is not "a question of days, hours, or minutes, but of seconds." Spermatozoa pass from the cervix to the uterine tubes in less than a minute. This is due to fluid in the lumen of the uterus and contraction waves of its musculature. This same condition of the uterus is found during heat in the cow.

Discussion

What practical application can be made of these hormones we have been discussing? Before any hormone can be used commercially, it is necessary to standardize it and be able to hold it in an active, unaltered form a sufficient length of time to make distribution possible. If estrin has any therapeutic value, it is yet to be proved. Its continued injection is said to produce a fibrous condition of the ovaries. The pituitary hormones have been found extremely unstable.

The sex hormones of the anterior pituitary are known to exist in the circulating blood of pregnant mammals throughout the entire period of pregnancy, and their detection here or in the urine is being used as a means of diagnosing pregnancy in the human. The limited work done on domestic animals seems to indicate that these tests

may prove of value in diagnosing pregnancy in animals also, although the urine test has to date proved unsatisfactory in the cow.

Papanicolaou,[25] claims changes in the adrenal of the guinea pig following injection of extracts of urine from either pregnant cows or pregnant women are so characteristic that they may be used as a means of diagnosing pregnancy. By a recent improvement in technic using young rats for test animals the test may be made in 36 to 48 hours; 100% accuracy was reported in 175 consecutive tests.

The ovulation-inhibiting and luteinization hormone may possibly prove of great value in treating nymphomania in cows. The luteal phase is certainly absent in nymphomania. Experiments using this hormone should be conducted. The presence of pituitary hormones in the blood of pregnant animals has led Rogers to attempt treatment of nymphomania in cows by injection of serum obtained from pregnant heifers. We must take Rogers' apparent results as merely suggestive until further work has been done.

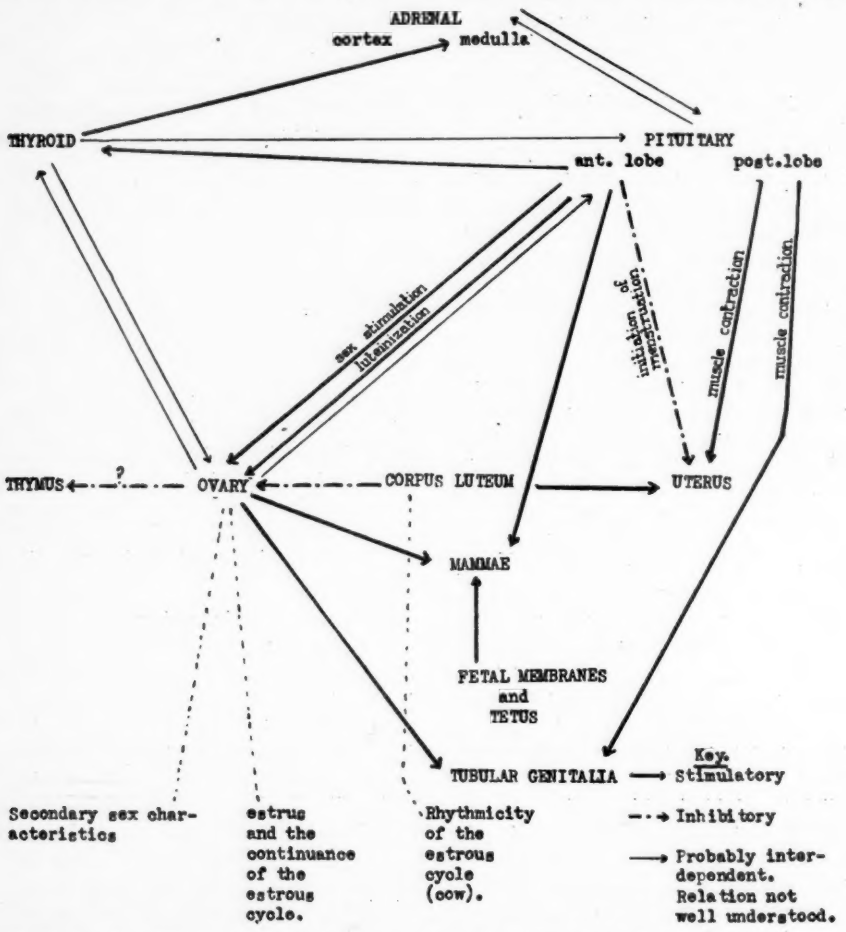

Chart showing the relation of the endocrines to each other, with reference to sex in the female. In some cases the influence of certain organs may not be direct, as indicated.

Treatment of an infantile condition of the ovaries and genital tract by the use of the sex-stimulating principle of the anterior pituitary would seem quite plausible. Fresh pituitary transplants might be tried. The number of lobes transplanted and whether it would be necessary to repeat remains for future experimental work to prove. The future will unquestionably provide us with a form of the sex-stimulating principle of the anterior pituitary sufficiently stable for clinical use.

Quite a large percentage of silver fox females do not breed the first year, on some ranches as high as 20% or more. While it is the policy of some ranchers to hold their females until they are two years old before breeding, others breed the first year and even pelt those females which fail to breed. Those who carry the fox until the second year claim they get better pups by doing so. There is a decided question whether this practice pays as the fox is nearly mature at one year of age. From experimental work carried out on the sex stimulating principle of the anterior pituitary there is little doubt but what those foxes failing to breed the first year could be made to do so by the injection of this principle. The writer has found the fox extremely sensitive to foreign protein, hence any extract used on the fox would have to be relatively pure and free from proteins.

Pituitary disease is not an infrequent cause of sterility in cows. It is rather difficult to diagnose clinically. Sterile cows are rarely kept long enough for sufficient changes of the bony cranial floor to take place so that it may be shown by the use of the X-ray. In certain types of cases, enlargement probably never would be revealed. In the cases of pituitary disease which the writer has positively diagnosed, the diagnosis was made on the packing house floor after the animals were given up as hopelessly sterile, but for no apparent reason. One symptom which seems to be quite diagnostic is an extremely large udder development in a virgin heifer; the udder appears as if the heifer had passed through one or two lactation periods, yet the history reveals the fact that she has never conceived. A steer-like appearance of the head and neck and asymmetrical distribution of fat on the body in the absence of genital disease also may be considered indicative.

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A strain of Brucella abortus of low virulence and apparently occupying an intermediate position between *B. melitensis* and *B. abortus,* is more or less prevalent in Palestine, according to Gilbert. The organism has not yet been isolated. The agglutination test indicates that sheep and goats are carriers.—*Bio. Abs.* 28211-1931.

Equine infectious pernicious anemia is due to a filterable virus but predisposing influences seem to be important factors in the occurrence of this disease. Thus, Fulton has observed that outbreaks of this disease occur usually on loam, rarely on heavy clay soil. The water in loam soil is usually acid; that in clay soil is alkaline.—Bio. Abs. 1331, 1932.

An arthritis in lambs has been observed in New Zealand by Hopkirk, in which a diphtheroid organism was isolated from affected joints. When inoculated into the circulation of lambs, it appeared to have a predilection for the joints. This diphtheroid organism is similar if not identical to the *B. erysipelas suis* although swine erysipelas is unknown in New Zealand. It is suggested that the microbe gains entrance through docking or castration wounds and that by using care in these operations infection may be presented.—Bio. Abs. 1338, 1932.

A fatal pulmonary disease of lambs occurs in the mountainous section of Kenya. Lambs up to one year of age are affected most frequently. Cattle and goats are apparently immune. Although the disease is usually acute, there are chronic cases. Chronic cases are probably carriers. A gram-negative, pleomorphic bacillus has been recovered from all cases and a diphlostreptococcus is occasionally found. It is probably secondary. This disease is characterized by extensive pleuropneumonia and empyema affected one or both lungs. A similar malady has been observed in some corn belt feeding lambs; however the American cases in the early stages are characterized by pulmonary edema.—Bio. Abs. 28228, 1931.

DOGS IN EUROPE

Paris boosted the annual dog tax from $1.60 to $3.20; it is estimated that 70,000 dogs are licensed in that gay dog of a city. The city of Berlin has weighed down the dogs so heavy with taxes that all are as low as the dachshund—$12.50 per dog; above four dogs, $60 each. Yet in 1930 Berlin collected $1,850,000 on the basis of 142,163 dogs.—*Dog World.*

HOG HAS A NEW COMPETITOR

Since the first of the year the United States has imported 5,200,000 pounds of sunflower-seed oil from Russia. This is the first importation of this product from Russia and the business is expected to develop into a large one. Sunflower-seed oil is used in the food and soap industries as a substitute for animal fats.

PULLORUM DISEASE

No baby chicks originating outside of the state may be transported in any manner into Oklahoma or offered or exposed for sale, or in any manner disposed of therein, unless originating from a hatchery which is certified by the proper livestock sanitary officials of the state of origin as complying with all the requirements relating to sanitation and bacillary white diarrhea control prescribed by the Oklahoma State Board of Agriculture.

ABORTION REQUIREMENTS

Unless from State Accredited Abortion-free herds, all dairy and breeding cattle must have passed negative agglutination test for Bang abortion disease within 30 days prior to shipment into New York state. The health certificate accompanying the shipment must give the name and address of the laboratory or person approved for conducting the test; said test must not have been conducted within 21 days following parturition or abortion and a description of each animal including ear tag number of each grade animal or name and registration number, if pure-bred, must in all instances be given.

Reviews and Abstracts

By FRITZ VOLKMAR, Columbus, Ohio

The Preventive and Curative Value of Collargol Against Anaplasmosis

Experiences with the Collargol[1] treatment in two outbreaks of acute Anaplasmosis among milk-cows are reported. The intravenous injection of 200cc of a 1% Collargol solution, when employed early, has proved an efficient therapeutic agent. Less success was observed when the same remedy was employed prophylactically in healthy cattle.

The New Anthrax Vaccine, "Carbozoo"

Living and virulent anthrax germs can be used successfully only for the purpose of immunization.[2] Excellent immunizing results are obtained when the vaccine, consisting of a mixture of living virulent germs and a 10% saponin solution, is injected subcutaneously. The characteristic lesions of anthrax appear at the site of injection, but there is no danger of generalization of the virus. Aside from slight temperature variations, the animals show no pathognomonic symptoms. This method of vaccination has been used with great success in cattle, sheep and goats in Italy and in Italian colonies. Up to the present time no casualities have occurred from the employment of this method, although, in 1930 alone, more than 300,000 animals were vaccinated.

[1] Lagas, D., and S. M. Seijffers, The Preventive and Curative Value of Collargol Against Anaplasmosis. Ned. Ind. Blad. Diergeneesk. 43 (1931): 6-19, abstr. *Zentralbl. f. Bakter,* etc. I Ref. 104:371.

[2] Mazzucchi, M., The new anti-anthrax vaccine "Carbozoo" and its application. Boll. Soc. Int. Mier. Sez. Ital. 3 (1931): 193, abstr. *Zentralbl. f. Bakter,* etc. I Ref. 105:99.

A fertile mare mule and her foal.

"Carbozoo" for the Prevention of Anthrax

The results obtained in the laboratory as well as in the practice with the single subcutaneous vaccination, using a suspension of virulent germs and spores to which *Saponinum purissimum album* has been added, are so remarkable that attention must be called to this Italian discovery. Undoubtedly it will have great possibilities in those countries in which bacterial anthrax is common. It seems proper to ask all nations to test this vaccine. The author[3] is inclined to consider it as the method of choice in prophylaxis. It surely suppresses the disease in those countries and regions in which it is permanently enzootic and causes large losses.

Venter Vaginal Incision for Spaying Mares

The modification by the ventral incision has been found to be an easy and harmless operation when spaying mares from the vagina. The mare is led to a piece of ground sloping 1:2 or 1:3, anesthesized and cast; the tail on the higher elevation. The rectum is evacuated and the entire posterior region moistened with water for the fixation of hairs and of dust. All smegma is removed and the anal and vaginal region is painstakingly cleaned and disinfected. Flushing of the vagina or emptying the bladder is omitted; as being injurious and tending to cause straining for urination; it also irritates the vaginal mucosa and stimulates the peritoneum. The well cleaned, disinfected and oiled arm is pushed into the vagina for orientation purposes, that is, to locate the os uteri and other organs. Following this,

[3] Gerlach, F., The use of the vaccine "Carbozoo" for the prevention of Anthrax in Austria. Bull. Off. Internat. d. Epizoot. 5 (1931): 289, abstr. *Zentralbl. f. Bakter,* etc. I Ref. 105:98.

[4] Weischer. Experience gained from the spaying of 40 mares, employing the ventral vaginal incision. *Berl. Tierärztl. Wchnschr.* 48 (1932): 97-100.

a covered knife is carried into the vagina, and immediately ventral to the os uteri, brought into position. It is slowly uncovered while the incision is made. This done, the knife is removed and the index finger is thrust through the wound. If by chance the peritoneum has not been cut, the wound in the mucosa is widened, the peritoneum is then grasped by forming a fold and torn open. (This is more difficult or even impossible in cows.) Should the peritoneum be pushed away from the wall of the vagina to a considerable extent, it will have no harmful consequences, as would be the case with the dorsal incision. The vaginal wound is further enlarged, the ovary located and removed. Following this, the patient is turned over and the other ovary is extirpated in the same manner. The author[4] always extirpates the clitoris, too, but merely for identification of the mare as spayed.

After treatment: Prevent mare from lying down for three days. Give her frequent exercise by leading.

Brucella Abortus Infection of the Arms

Seventeen percent of Swiss veterinarians report[5] skin affections which they acquire immediately following obstetrical operations and the removal of the secundinae. Aside from the itching erythemata, described by Huddleson and Johnson, urticarial symptoms were observed, which were apparently caused by substances, normally present in the bovine organism. Further investigation is needed to determine whether the urticaria occurring shortly after vaginal and uterine manipulations, can be interpreted as Bang-infection. The skin lesions characterized by the eruption of follicular papules and pustules, observed on the arms usually several hours after manipulations, and having a tendency to recidivations, may be traced to contact with Bang-infected animals.

[5] Riedmüller, L., and H. Stihl. Occupational dermatoses of Veterinarians, following vaginal manipulations in cattle. *Schweiz. Arch. f. Tierheilk.* 73 (12): 588-595, 1931.

Twins—a mule and a horse.

Avian Tuberculosis in Man

The transmission[6] of avian tuberculosis to man is an established fact; proved in more than 50 cases. The clinical picture of this tuberculosis in man is many sided. It may assume the picture of tuberculosis of the lung, pleura, skin and mucous membranes and of other organs. A peculiar characteristic of it is its great tendency toward a septicemic course, for, it develops into a pure septicemia; not a toxemia. It is often associated with periods of fever, lasting for many months; and again, it may be interrupted by periods, free from fever, lasting for years. The periods of fever show low morning temperatures and high evening temperatures, up to 39° C. They are not influenced by antipyretics. The general condition of the patients is satisfactory, the appetite is not disturbed. In addition to the fever, night sweats occur. At the height of the disease, a firm, often painful spleen tumor is observed. The duration of the disease may be short and lead to death in two to four weeks; but mostly, it will extend over years. It often localizes in the kidneys and in the bone marrow. For the allergic test, the avian tuberculin alone will give a reaction. For a bacteriological diagnosis, the culture experiment is superior to the animal typing. The excessive number of bacteria in fresh material is very remarkable. On firm media, the bacterium grows as a moist, slimy and easily detachable film. Its growth is faster too, than the growth of the human and bovine types. It is pathogenic for birds, man and rabbits. In avian tuberculosis of man, caseations are absent as a rule. Focal infections are mostly in form of a tissue necrosis; finally changing to pus formation. The spleen is relatively enlarged; either soft or firm, occasionally

[6] Klimmer, M. Transmission of avian tuberculosis to man. *Münch. Med. Wochenschr.* 1931:1212.—abstr. *Deutsche Tierärztl. Wchnschr.* 40 (2): 30.

dispersed with pea-sized, yellowish foci. On microscopical examination, nests of tubercle bacteria are found in these organs. The specific therapy with homologous tuberculins has been found useful, according to Löwenstein. Tuberculous chickens and other fowl are the primary sources of infection. The transmission to man takes place mostly by way of the digestive tract; from the eating of flesh, organs and eggs of tuberculous fowl. Infection of wounds while cleaning poultry-dishes, soiled with feces from tuberculous chickens is apt to cause lupus. Transmission from man to man has not been observed. Prevention of infection calls for sanitation on poultry farms; another safeguard is the thorough boiling, (8-9 minutes) of eggs, and of meats coming from poultry farms not absolutely free from tuberculosis.

B. C. G. Vaccination in Austria

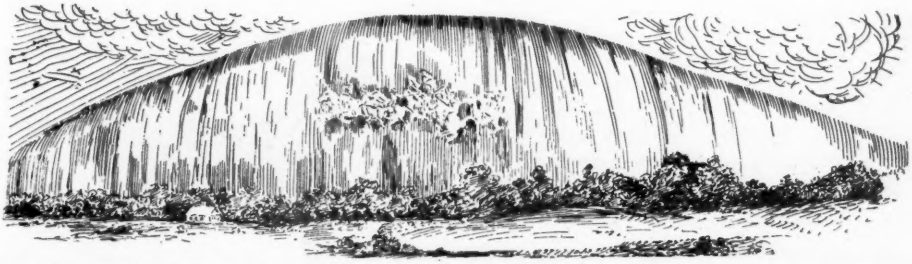
The present status of the B. C. G. problem is discussed in general and on the basis of special experiments. Gerlach's [7] experiments command the widest interest. Under his direction more than 2000 cattle from heavily diseased herds of Austria have been vaccinated; some of them as often as four times. The vaccination and revaccination were done subcutaneously according to the directions of Calmette. No vaccination breaks have occurred. The local reaction was minimal. B. C. G. proved completely harmless to calf and cow. The effect of the vaccination was the greater, the better the hygienic rules (separation and TB-free nutrition), prescribed for the calves to be vaccinated, were enforced. A certain immunizing value of the B. C. G. protective vaccination in each case cannot be doubted. 100% efficiency cannot be expected from any method of immunization, certainly not from tuberculosis immunization.

[7] Gerlach. The anti-tuberculosis vaccination of animals. Echo vet. 60 (11): 269-273. 1931. abstr. *Tierärztl. Rundschau* 38 (11): 183.

B. C. G. Vaccination of Poultry

A total of 84 chickens were immunized with avian B. C. G.[8] after the 141st passage. When dispensed in fractioned doses it proved harmless to chicks one to two weeks old. The vaccine does not restrict the growth of the vaccinated chicks. Small doses of B. C. G. vaccine (5-10mg per os or 2.5-3mg subcutaneously) never produced tuberculosis lesions. Checking the post-vaccinal allergy to tuberculin, a positive reaction could be obtained only from chickens that had been vaccinated subcutaneously with 2.5-3mg B. C. G. vaccine; not from those vaccinated perorally with fractioned doses of 5-10mg. The author reasons that part of the vaccine is destroyed by the secretions of the digestive tract and the remainder is not sufficient to establish immunity. The check of the reliability of the immunization proved that the chickens vaccinated subcutaneously with 2.5-3mg B. C. G. withstood completely a peroral infection with 3mg of virulent avian tubercle cultures; but they did not resist a subcutaneous or intramuscular infection with 1mg of virulent culture.

[8] Roubicek. Active immunisation of poultry with avian B. C. G. Zverolekarske rozpravy 5 (15): 179-180, (16): 183-192, (17): 201-204, (18): 213-216, (19): 226-228, (20): 239-240, (21): 251-252, abstr. *Tierärztl. Rundschau* 38 (11): 183.



Few, if any, civic enterprises in the history of the United States have received more publicity than the war memorial on the face of Stone Mountain, just a few miles from Atlanta, where the A. V. M. A. convention will be held next August. The illustration shows the first of several groups to be carved in the wall of granite hundreds of feet above the ground. The figures are 125 ft. high.

Mastitis Test

The new reagent,[9] "Gnothilakter-paper," is a filter-paper impregnated with a chemical indicator for the determination of the hydrogen ion concentration in the milk. If the udder is normal, the Gnothilakter-paper will turn yellowish-green. Diseased udders are recognized by a dark-green to bluish-green discoloration of the Gnothilakter-paper. In severe mastitis the paper may turn into a blue color, rarely (when the reaction is strongly acid), into a quince-yellow. The time after which the reaction may be read is two minutes. Shortly after calving the Gnothilakter-paper may indicate a quince-yellow, and near the end of the lactation period the color of the test-paper may be green to bluish-green. However, in contrast to the pathological conditions, all four quarters will give uniform reactions. The color-reactions are fast and do not fade. They can, therefore, be kept on record, and the progress of the treatment thus can be checked, from time to time.

The Steinach Operation

Steinach, in 1910, published his first successful operations with permanent transplantation, which restored early castrated animals to full somatic and psychic development, and which prevented involution in recently castrated animals. The school of Steinach succeeded, also in the sex reversal of castrated males and the more difficult mutation of spayed females. The success of the vasoligation in aged man pointed to a similar possibility on cattle. The author[10] activated bulls, showing lack of libido, or less of fertility, and those being of an asthenic habitus, by a specific operation. Seventeen bulls received testicular transplantation. Eleven of them responded exceedingly well. Twenty bulls received a unilateral vasoligation. Fifteen of them responded to the treatment. The improvement, as far as observed, lasted for years. Thirty-two underdeveloped sterile cows were treated with follicular substance. Positive results followed in 28 cases. By the use of corpora lutea, the amount of milk was increased in 10 out of 13 cases treated. Finally, prepubescent (3-7 months old) immature animals, given germinal gland transplantations, matured earlier than the control animals. The experiments are of momentous importance to the breeder and biologist. Details of the operation and the technic must be read in the original.

[9] Schmidt, W. A new rapid auxiliary method for the clinical examination of the udder. *Tierärztl. Rundschau* 38 (10): 153-155. 1932.

[10] Grüter, F. Activation of somatic-psychicly underdeveloped breeding animals through enrichment of their germinal gland hormones. *Wien. Arch. f. int. Med.* 21 (1931): 381-386. abstr. *Tierärztl. Rundschau* 38: 166.

Nymphomania in Cows

Nymphomania [11] is usually related to persistent follicles or to follicular cysts. Persistence of follicles is partly caused by disturbances of the inner secretions of the hypophysis anterior lobe and partly by diseases of the ovaries. The essential point in the origin of cysts is the disturbance of the mechanism of ovulation, either primary, ovarial (disease of the ovary) or extra-ovarial (hypophysis anterior lobe, epiphysis; not remedied by spaying). These disturbances may be caused either by endogenous or exogenous factors. The ovarial diseases which cause persistence of follicles, formation of cysts and abnormal production of hormones, in spite of normal secretion of the hypophysis anterior lobe, are mostly ascending from the uterus. Other causes of nymphomania may be found in hypersecretion of hypophysis anterior lobe or insufficiency of the corpus luteum. Diseases of other organs and external influences, such as

[11] Frei, W. The innersecretory relations in nymphomania of cows. *Schweiz. Arch. f. Tierheilk.* 73 (1931): 537-550.

faulty management and dietary errors, will likewise cause ovarian diseases, either directly or indirectly. The prolonged estrum in cows, though occurring at intervals, is caused by delayed ovulation; while the shortening of the estrus periods traces back to insufficient inhibitory effect of the yellow body; possibly hyperfunction of the hypophysis anterior lobe.

Puerperal Hemoglobinuria in Cattle

The real cause of this disease is not known. The observations,[12] made so far, seem to inculpate intensive lactation and certain dietary errors as predisposing agents. Aside from the rapid progressive anemia, which frequently terminates fatally, there is more or less marked hemolysis. Liver-necrosis is a characteristic autopsy finding. It has been found experimentally, that the stromata of damaged red blood corpuscles will occlude the liver-capillaries. This causes localised vasculary disturbances and, finally, necrosis. It seems that the hemoglobin does not play a rôle in the origin of this necrosis.

The Cause of Azoturia

Azoturia[13] (Hemoglobinuria) occurs in horses which, following a period of work, enjoy a period of rest, usually 2-4 days, rarely up to 14 days, and which receive heavy amounts of food during this time. Without these pre-requirements the disease is not to be observed. These conditions are, therefore of great importance from an etiological point of view. The disease is characterized by a waxy and granular degeneration of the body muscles, leading to motory disturbances and myoglobinuria. During the period of work and immediately following it a glycogen-store has collected in the muscles which, after rest, is too large in proportion to the functional state into which the muscles pass. Since it is difficult for the muscles to free themselves from this excess during rest, the muscles are burdened with an excess load of glycogen. If now the animal in question is called to work under these conditions, then it is imaginable that the work causes either a very rapid decomposition of glycogen into lactic acid, until the glycogen store of the muscles reaches the normal proportion relative to the state of function, or the resynthesis of lactic acid into glycogen is made more difficult so long as the muscles contain an abnormally large glycogen store. Both possibilities lead to the same result, a great lactic acid accumulation in the muscles. Under the assumption that the increase of the lactic acid formation, due to abnormal glycogen accumulation in the muscles, is the cause of muscle changes in azoturia, this conception concerning the glycogen metabolism in the muscles easily explains why, on the one hand, azoturia does not occur in a horse until after a few days rest and, on the other hand, that the susceptibility to the disease diminishes gradually after prolonged rest. In addition to the increased store of glycogen in the muscles, the stable-rest, one of the predisposing causes of azoturia, causes a change in the muscles, to which especial importance may be ascribed. The oxygen requirements and the circulation in the muscles depend on the function of the muscle. During rest the muscle capillaries contract, the lumen becomes so narrow that the red blood corpuscles can pass slowly, only and after altering their form thoroughly. With the beginning of muscular work, the muscle capillaries gradually open, as needed, and enlarge and the circulation begins to speed up.

Naturally, the longer a muscle is inactive, the more completely the capillaries will close, and the slower they will open when work is resumed. This behavior is of great importance for the chemical processes in the muscle during work. Of course, the muscle will work under a relative oxygen deficiency before a sufficient number of capillaries has opened up, causing a lactic acid store in the muscle and an increased feeling of tiredness. Thus the effect of an increased glycogen store in the muscle is heightened by the relative oxygen deficiency with respect to lactic acid formation. The lactic acid formation is, therefore, greatest

[12] Hjärre, A. Puerperal hemoglobinuria of cattle. *Acta Path. et Microbiol.* Scandinav. Suppl. 7 Upsala 1930. abstr. *Folia Haematologica* 46: 327.

[13] Carlström, B. Etiology and Pathogenesis of Azoturia of Horses. *Skandinav. Arch. f. Physiol.* 62 (1931): 182 pp.

at the beginning of a muscular exertion after a period of rest.

As a matter of fact, azoturia occurs immediately at the beginning of work, usually 10-20 minutes after leaving the stable. It is true, azoturia has been observed after a longer period of work, that is, after one to several hours, but in such cases the author observes that the horse has been subject to intermittent rest which retards the glycogen storage. Recidivations do not occur in azoturia, that is, horses recovered from the disease do not recidivate when used for work again. It is the author's opinion, that the excess of glycogen in the muscle has been used up during the disease. A renewed occurrence of the disease can set in only then when a new excess of glycogen has formed in the muscle. It is the merit of the author to have cleared up the origin of the blood pigment in azoturia, which disease, therefore, should rather be called "myoglobinury."

Etiology of Saddle Wounds in the Cavalry

Wounds from the saddle or the harness of the pack saddle are common among horses used in the cavalry. Lagaillarde [14] claims that secondary infection in harness wounds are the chief cause of worry in trying to produce prompt healing, due to their slow response to therapeutic methods.

The two principle causes of this trouble are compression and bruising of the parts.

Wounds from bruising are located almost exclusively on the middle line of the neck, withers, back and loins. During rapid gait the saddle cloth becomes displaced and on making violent contact against the dorsolumbar line makes repeated traumatisms.

Wounds from compression are due in a large part to the weight of the pack saddle, and the taut girth necessary to maintain pack in proper balance, following this infections are noticed causing much inflammation of the part or parts, characterized in the beginning by a warm edema that is more or less extended.

To prevent this he suggests modifications, lessening the dead weight carried by the horse, and making a narrower girth and modifying the padding of the saddle by substituting a piece of felt covered by a plate of copper that could be washed easily.

[14] Lagaillarde. Etiologie des blessures de harnachement dans la cavalerie. Revue vétérinaire militaire, Dec. 1930, Revue des publications, *Revue Vétérinaire et Journal de Médecine Vétérinaire et Journal de Médecine Vétérinaire et de Zootechnie*, Feb. 1932, pp. 95-96. Abstracted by J. G. Horning.

Mountain Sickness

The veterinary pathology and records about this condition are very rare. Lardeyret [15] gives a description of the symptomatology of this condition following observations he was able to gather upon horses used in Alpine maneuvers.

The principal symptoms are general muscular fatigue, accompanied by acceleration of the respiration and pulse.

Animals insufficiently trained were particularly predisposed to this trouble, as were those having any functional trouble of the heart or lungs.

Tuberculosis of the Face of a Cat

The tuberculosis of the face of a cat has already been indicated by Cadiot, Petit and Coquot, Petit and Basset, Charmoy, Douville. The author [16] publishes four new observations gathered in the service of medicine of the Veterinary School of Alfort. He points out the frequency of these tubercular localizations which should be suspected each time that one is in the presence of a deformity of the face of the animal without apparent cause and for a stronger reason when it results from an ulcer or suborbital fistula. The hypertrophy of the ganglions of the head and of the neck is not fatal. The failure in searching for the tubercular bacillus in the lesions of the face are not sufficient tests for affirming the nonexistence of tuberculosis. That which has struck the author most, in this tuberculosis of the face of the cat, is the deformation of the head giving to the animal a profile like the beak of a parrot.

[15] Lardeyret. Le mal de montagne. Revue vétérinaire militaire, Dec. 1930. Revue des publications, *Revue Vétérinaire et Journal de Médecine Vétérinaire et de Zootechnie*, Feb. 1932, p. 95. Abstracted by J. G. Horning.

[16] Goret. Tuberculosis of the face of a cat, *Receiul de Méd. Vétér.* July 1930, pp. 14-15. Abstracted by J. G. Horning.

Book Reviews

The Principals of Animal Hygiene and Preventive Veterinary Medicine: By L. Van Es, V.S., M.D., Professor of Animal Pathology and Hygiene, University of Nebraska, Lincoln, Nebraska. Octave of 768 pages, well illustrated. Published by John Wiley & Sons, Inc., New York, N. Y. Cloth, $6.50.

This work, although it deals with animal hygiene and veterinary medicine, is in no sense a veterinary hygiene, nor is it designed for veterinarians other than perhaps those engaged officially in live stock sanitation. Apparently it is the material which Doctor Van Es, after 25 years' experience in lecturing to agricultural students, has decided is most suitable for them.

The discussion of ecologic relations—the environmental factors that affect the health or morbidity of animals—is fully in keeping with the high class, scholastic treatment we have come to expect from its author. The discussion of soil, air, water, food and poisonous plants as they promote the health or contribute to disease of domestic animals is commendable for its thoroughness and subject to criticism if at all, only for its unusual length in a text of this scope.

The discussion of the disposal of wastes disinfestation and disinfectants, together with the foregoing, comprises about half the text. The remainder, the discussion of specific diseases, is much less satisfactory from a veterinary viewpoint, which obviously is less important than the animal husbandman's viewpoint, since it is primarily for the latter.

Parasites and particularly internal parasites, receive scant consideration and that not always of a helpful nature. Pasture rotation is recommended for the control of stomach worms in sheep without stating that 20 to 30 pastures per flock are required for such means of control. It is deplored that in many parasitisms treatment of the individual is about all that can be done, without explaining that therapeusis of the affected animals is often a highly effective preventive measure for the remainder of the herd. The dog seems about ruled out as a domestic animal. But two of his diseases, distemper and rabies, come in for consideration and the discussion of the former is regretably incomplete.

The basis upon which diseases were selected for consideration is not apparent, at least not to this reviewer, who sees no necessity for the inclusion of contagious pleuropneumonia, bluetongue, heartwater, African horse sickness, cattle plague, braxy and other diseases that do not occur at present, and are unlikely to occur in the future, in this country, in a text for "students in schools and colleges, livestock sanitarians, and those engaged in animal husbandry." Equally irrelevant, appears a discussion of the Bang and the Ostertag methods for the control of bovine tuberculosis.

The discussions of diseases are limited to a consideration of the history, occurrence and prophylaxis; detailed symptoms, lesions and treatment are logically omitted. No mention is made of the need for veterinarians to carry out preventive measures. Perhaps this is inferred since directions are not given. While the discussions evidence the greatest familiarity, on the part of the author, with the literature on the subject, the lack of that finesse in handling it, that is inescapable from a lack of personal contact with the subject is sometimes apparent.

Some statements will afford veterinary readers mild surprise, e.g., glanders must still be regarded as the most formidable of horse diseases. The use of a five-year-old distribution map for Texas fever, showing its presense in Mississippi. The long discussion of piroplasmosis as it has occurred all over the world with no mention of the account of Professor Gamgee, the most interesting report ever written on Texas fever. The discussion of diseases of reproduction without mention of sexual hygiene as a means of prevention.

Animal husbandmen are not told that the common practice of breeding dairy heifer calves at 15 months of age or even younger, or attempting to get a calf a year from a

heavy producing dairy cow ten years of age or older, is fraught with any hazard to the animal's usefulness. The caution as to the use of young bulls is exceedingly reserved. Nor are these abuses mentioned as contributing factors in abortifacient infections.

It would appear, that for the agricultural student, the work would have been improved by a general discussion on causes of disease, the portals by which they enter the bodies of animals, how and where they multiply and the avenues of elimination and spread to other individuals. Also, a discussion of the prevailing views as to the various ways in which the animal body protects itself from the disease invaders would appear pertinent, to give the reader a better understanding of immunology, bacteriology and fiterable viruses which, by the way, are responsible for 13 of the 34 typical infections discussed.

The author is slavishly subservient to research, which, of course, is justified by good research, but much of the research of the past merits no such loyalty, even from a research worker. Unintentionally, an illustration of this is given. In an otherwise excellent discussion of hemorrhagic septicemia, the author cites the findings of half a dozen different research projects to prove that hemorrhagic septicemia bacterins are without prophylactic (or other) value. Of course this can have no effect on the recognized standing of this biologic, but it does illustrate how research may sometimes lead astray.

Withal, the work contains a vast amount of useful veterinary information, pleasingly presented. The first half of it is mostly new in veterinary literature and the historical information and the large number of references to the literature (unfortunately mostly in foreign languages) on the specific diseases constitute a convenient and useful compilation of such material. The author's obscession for state veterinary medicine is somewhat irritating just at this time when government, both state and national, is floundering from its own inanity, its cost sinking the taxpayer and its activities strangling the national welfare.

Neoplasms of Domesticated Animals: By William H. Feldman, D. V. M., M. D., Division of Experimental Surgery and Pathology, The Mayo Foundation, Rochester, Minnesota. With a foreward by Charles H. Mayo, M. D. Octavo of 410 pages with 193 illustrations. Published by W. B. Saunders Company, Philadelphia, Pennsylvania, 1932. Cloth, $6.00 net.

Heretofore, there has been no treatise in English devoted entirely to a detailed consideration of neoplasms as they occur in domestic animals, although in human pathology there are many such works. Not-withstanding tumors are common in animals, and much information concerning them has been elucidated, largely incidental to the study of neoplasms in man, veterinary interest in them would appear to have been low, if we judge by the small number of cases that have been reported in veterinary literature. Perhaps this excellent treatise will have the effect of centering attention upon this important phase of veterinary pathology and increasing the general interest in it.

It is no easy task to take a pathological condition of which we do not know the cause or any means of prevention and for which such treatments as are known are to a large degree, impractical for animals and clothe it with interest that will hold the reader's attention to the end; but the author has done it, in this discussion, through his sheer enthusiasm and his comprehensive knowledge of the known facts.

The descriptive matter pertaining to the gross and microscopic features of the various types of tumors is based upon an examination of original material in the collection of the author. This collection approximates 600 specimens.

The description and classifications of neoplasms given in this volume will prove helpful in diagnosis and prognosis. The many excellent illustrations of neoplastic tissues serve not only to identify tumors from microscopic slides but to explain their method of development. This work furnishes all the available information in an important and much neglected field of veterinary pathology.